

04-07-00

09/543381

04/05/00
jc662 U.S. PTO

jc525 U.S. PTO
09/543381
04/05/00

"Express Mail" mailing label No. EK 525927576 US Date of Deposit April 5, 2000
I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to: Box PATENT APPLICATION, Assistant Commissioner for Patents, Washington, D.C. 20231.

Victoria Mah
Victoria Mah

Patent
Attorney's Docket No. KTI-001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

UTILITY PATENT
APPLICATION TRANSMITTAL LETTER

Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

Sir:

Enclosed for filing is the utility patent application of Michael Chen, Jan Fandrianto, Chun-Chau Lin, Michael Sadikun, Budi Sutardja, and Ramah Sutardja for METHOD AND SYSTEM FOR PROVIDING VOICE COMMUNICATION OVER DATA NETWORKS.

Also enclosed are:

- ☒ 16 sheet(s) of ☐ formal ☒ informal drawings;
- ☐ a claim for foreign priority under 35 U.S.C. §§ 119 and/or 365 is ☐ hereby made to filed in _____ on _____;
- ☐ in the declaration;
- ☐ a certified copy of the priority document;
- ☐ a Constructive Petition for Extensions of Time;
- ☒ one statement(s) claiming small entity status;
- ☒ an Assignment document;
- ☐ an Information Disclosure Statement; and
- ☒ Other: specification, claims, abstract, Assignment Recordation Cover Sheet, (1) return postcard, check no. 1542, Declaration and Power of Attorney

The declaration of the inventor(s) ☒ also is enclosed ☐ will follow.

[] Please amend the specification by inserting before the first line the sentence: -This application claims priority under 35 U.S.C. §§ 119 and/or 365 to _____ filed in _____ on _____; the entire content of which is hereby incorporated by reference.—

The filing fee has been calculated as follows [] and in accordance with the enclosed preliminary amendment:

CLAIMS					
	Number of Claims		Extra Claims	Rate	Fee
Basic Application Fee					\$690.00
Total Claims	46	Minus 20 =	26	x \$18.00	\$468.00
Independent Claims	7	Minus 3 =	4	x \$78.00	\$312.00
If multiple dependent claims are presented, add \$260.00					
Total Application Fee					\$1470.00
If verified Statement claiming small entity status is enclosed, subtract 50% of Total Application Fee					\$735.00
Add Assignment Recording Fee of \$40.00 if Assignment document is enclosed.					\$775.00
TOTAL APPLICATION FEE DUE					\$775.00

[x] Check No. 1542 in the amount of \$ 775.00 is enclosed for the fee due.

Please address all correspondence concerning the present application to:

Komodo Technology, Inc.
170 Knowles Drive, Suite 2
Los Gatos, CA 95032

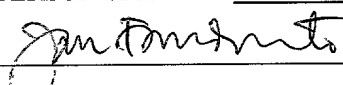
This paper is submitted in duplicate.

Respectfully submitted,

Komodo Technology, Inc.

Date: 4-5-00

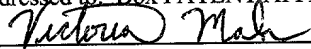
By: Victoria Mah
Victoria Mah
Registration No. 44,889

STATEMENT CLAIMING SMALL ENTITY STATUS (37 C.F.R. §§ 1.9(f) & 1.27(c)) – SMALL BUSINESS CONCERN	Docket No. KTI-001
<p>I hereby declare that I am:</p> <p><input checked="" type="checkbox"/> the owner of the small business concern identified below:</p> <p><input type="checkbox"/> an official empowered to act on behalf of the small business concern identified below:</p> <p>NAME OF CONCERN: <u>Komodo Technology, Inc.</u></p> <p>ADDRESS: <u>170 Knowles Drive, Suite 2, Los Gatos, California</u></p> <p>I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 C.F.R. §§ 121.3 – 18, and reproduced in 37 C.F.R. § 1.9(d) for purposes of paying reduced fees under 41(a) and (b) of Title 35, U.S. Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other, or a third party of parties controls or has the power to control both.</p> <p>I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention entitled: <u>"Method and System for Providing Voice Communication Over Data Networks"</u></p> <p>By inventors <u>Michael Chen, Jan Fandrianto, Chun-Chau Lin, Michael Sadikun, Budi Sutardja, and Ramah Sutardja</u>, Attorney Docket No. <u>KTI-001</u>, described in:</p> <p>(x) the application filed herewith</p> <p>() application serial no. _____, filed _____</p> <p>() patent no. _____, issued _____</p> <p>If the rights held by the above-identified small business concern are not exclusive, each individual, concern, or organization having rights to the invention is listed below and no rights to the invention are held by any person, other than the inventor, who could not qualify as an individual inventor under 37 C.F.R. § 1.9(c) if that person made the invention or by any concern which would not qualify as a small business concern under 37 C.F.R. 1.9(d) or a nonprofit organization under 37 C.F.R. 1.9(e).</p> <p>NAME: _____</p> <p>ADDRESS: _____</p> <p style="text-align: center;"> <input type="checkbox"/> individual <input type="checkbox"/> small business concern <input type="checkbox"/> nonprofit organization </p> <p>I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 C.F.R. § 1.28(b))</p> <p>I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 101 of Title 18 of the U.S. Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.</p> <p>NAME OF PERSON SIGNING: <u>Jan Fandrianto</u></p> <p>TITLE IN ORGANIZATION: <u>CEO</u></p> <p>ADDRESS OF PERSON SIGNING: <u>170 Knowles Drive, Suite 2, Los Gatos, California</u></p> <p>SIGNATURE: <u></u> DATE: <u>4/5/2000</u></p>	

"Express Mail" mailing label No. EK 525927576 US

Date of Deposit April 5, 2000

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to: Box PATENT APPLICATION, Assistant Commissioner for Patents, Washington, D.C. 20231.



Victoria Mah

Patent

Attorney Docket No. KTI-001

METHOD AND SYSTEM FOR PROVIDING VOICE COMMUNICATION OVER DATA NETWORKS

RELATED APPLICATIONS

This application claims priority to U.S. Application Serial Nos. 60/161,168, filed on October 22, 1999; and 60/166,085, filed on November 17, 1999, the entire contents of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a system and method for providing voice communication to subscribers over data networks.

Brief Description of the Related Art

Networks carry three types of information: voice, video, and data. Historically, these different forms of information have been transported over different networks. Specifically, the telephone network delivered voice information; private corporate networks delivered data information; and broadcast networks delivered video information. Each service was provided by a

specific form of infrastructure -- the telephone network used copper wires to reach subscribers, broadcast television used the airwaves, cable television used coaxial cable, and so forth.

With advances in technology, the different forms of information can now be carried by any delivery platform. For example, telephony services (i.e., voice and facsimile) can be transported over data networks, such as the Internet.

"Internet telephony" refers to the transfer of voice information using the Internet protocol (IP) of the TCP/IP or UDP/IP protocol suite. Internet telephony uses the Internet to simulate a telephone connection between two Internet users and to bypass the local exchange carriers' and inter-exchange carrier's telephone networks. Internet telephony works by converting voices into data which can be compressed and split into packets. These data packets are sent over the Internet like any other packets and reassembled as audio output at the receiving end. The ubiquitous nature of the Internet allows a user to complete such Internet telephone connections to many countries around the world. Accordingly, by using the Internet to provide telephony services, the user can avoid paying per-minute toll charges assessed by the user's local exchange carrier and/or inter-exchange carrier. Rather, the user is subject to only his or her local Internet connection fees. The result may be considerable savings when compared to international telephone rates.

In addition, the Internet utilizes "dynamic routing," wherein data packets are routed using the best routing available for a packet at a particular moment in time, given the current traffic patterns. This system allows many different communications to be routed simultaneously over the same transmission facilities. In contrast, a circuit-switched telephone network, such as the public switched telephone network (PSTN), establishes dedicated, end-to-end transmission paths. Consequently, the Internet allows network resources to be used more efficiently.

Most existing dial-up systems require both parties to be connected to the Internet through a multimedia personal computer to establish an Internet telephone call. As shown in FIG. 1, the multimedia personal computers, which have been loaded with certain telephony software, can access the data network using a local circuit-switched telephone network to a voice over packet gateway

CONFIDENTIAL

residing in an Internet Service Provider (ISP) point of presence.

The typical multimedia personal computer system used for Internet telephony includes a personal computer, a monitor, an analog-voice-to-digital-signal and digital-signal-to-analog-voice converter (converter), Internet telephone software, a full-duplex sound card, a microphone, speakers, and a 28 Kbps or higher rate modulation/demodulation (modem) device. As such, the multimedia personal computer system includes several components or devices and is not easily portable, which may be undesirable for travelling business people. Further, such a personal computer system may be expensive to set up and maintain.

Accordingly, it would be desirable to provide a method and system for voice communication over a data network that addresses the drawbacks of known systems.

SUMMARY OF THE INVENTION

The present invention relates to a method and system for providing voice communication over data networks. The system according to the present invention allows subscribers using Internet telephones to conduct real-time voice conversations over a data network and/or over a circuit switched network.

In accordance with one aspect of the present invention, a method for establishing voice communication between a first and a second station over a data network includes the steps of receiving a data network address for the first station at a second station via a first communication channel, disconnecting the first station and the second station from that first communication channel, and establishing a second communication channel between the first and the second stations whereby the station users can conduct voice communication over the data network. The second communication channel is established by using the data network address received at the second station.

CONFIDENTIAL

In accordance with an additional aspect of the present invention, a device for initiating voice communication with a second device includes a storage medium having a plurality of programming modules and a single activation means for causing the device to establish a communication channel over a data network. When the single activation means has not been activated, the communication channel between the devices is established over a circuit switched network. The single activation means may include, but is not limited to, a programmable button, a movable switch, voice activation, or movement sensor activation.

In accordance with a further aspect of the invention, a device for establishing voice communication with a second device includes a compatibility module, for determining whether the second device can support voice communication over a data network, and a call initialization module. If the second device supports voice communication over a data network, the call initialization module automatically transmits a command which causes a communication channel to be established between the Internet telephonic device and the second device over a data network.

In accordance with yet another aspect of the invention, a network server located on a data network includes a storage medium having a plurality of programming modules and a channel establishment module. One programming module, the registration module, registers a code and a data network address into a memory in response to receiving a register command signal. The code uniquely identifies a calling station connected to the data network. A second programming module, the address query module, causes a search for the code to be performed on the memory in response to receiving a search command signal. A third programming module, the address mapping module, identifies the data network address based on the search results.

The present invention provides advantages of establishing real-time voice communication channels over the Internet, and thereby avoid paying per-minute toll charges assessed by local or inter-exchange telephone carriers. In addition, the present invention enables a user to conduct voice conversations over the Internet without having to purchase and assemble the many components and devices required in a multimedia personal computer system.

CONFIDENTIAL

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in greater detail with reference to the preferred embodiments illustrated in the accompanying drawings, in which like elements bear like reference numerals, and wherein:

FIG. 1 illustrates multimedia personal computer systems connected over the Internet in accordance with the prior art;

FIG. 2a illustrates an Internet telephone call system according to the present invention;

FIG. 2b illustrates a first embodiment of the Internet telephone call system of FIG. 2a;

FIG. 2c illustrates a second and alternative embodiment of the Internet telephone call system of FIG. 2a;

FIG. 2d illustrates a third and alternative embodiment of the Internet telephone call system of FIG. 2a;

FIG. 2e illustrates a fourth and yet further alternative embodiment of the Internet telephone call system of FIG. 2a;

FIG. 3 illustrates stored data in a network server database;

FIG. 4 is a block diagram of the hardware architecture of the network server;

FIG. 5 is a block diagram of the memory unit of the network server of FIG. 4;

FIG. 6 is a perspective view of one embodiment of an Internet telephone;

CONFIDENTIAL

FIG. 7 is a block diagram of the hardware architecture of the Internet telephone;

FIG. 8 is a block diagram of the memory unit of the Internet telephone of FIG. 7;

FIG. 9 is an enlarged rear view of a portion of the Internet telephone of FIG. 6;

FIG. 10 is a flowchart showing a first embodiment of a method of negotiating a telephone call over a data network in accordance with FIG. 2b;

FIG. 11 is a flowchart showing a second and alternative embodiment of the method of negotiating a telephone call over a data network in accordance with FIG. 2c;

FIG. 12 is a flowchart showing a third and alternative embodiment of the method of negotiating a telephone call over a data network in accordance with FIG. 2d; and

FIG. 13 is a flowchart showing a fourth and yet further alternative embodiment of the method of negotiating a telephone call over a data network in accordance with FIG. 2e.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 2a illustrates a configuration of an Internet telephone call system 10. The Internet telephone call system 10 can transport voice over a packet-switched network 12, such as the Internet, using data packets or over a circuit-switched network 14, such as the public switched telephone network (PSTN). Accordingly, an Internet subscriber (hereinafter "subscriber" and not shown) having the necessary hardware and software may conduct real-time voice conversations over the Internet 12 or over the PSTN 14, rather than limited to using only the circuit switched network. The Internet telephones 16, 18 forming the call system 10 may include a conventional telephone and an adaptor having Internet telephony enabling hardware and software, e.g., the Komodo Fone™

CONFIDENTIAL

product available from Komodo Technology, Inc. of Los Gatos, California. Alternative Internet telephones 16, 18 may integrate the telephone and the Internet telephony enabling hardware and software into a single system, as discussed in further detail below with respect to FIGS. 6-9.

As shown in FIG. 2a, the Internet telephone call system 10 includes at least two Internet telephones 16, 18, each connecting to a central office (CO) 20, 22 and/or a local area network (LAN) 24, 26. Further, each Internet telephone 16, 18 has an associated Internet Service Provider (ISP) 28, 30 in order to access the Internet 12. As such, the subscriber may select the manner of communication when making a telephone call.

For example, the subscriber may choose to make a traditional telephone call, wherein the Internet telephones 16, 18 are linked and the call routed via a PSTN 14 through the COs 20, 22. Alternatively, the subscriber may cause the Internet telephone 16, 18 to place the telephone call over the Internet 12 by accessing the ISP 28, 30 via the LAN 24, 26 or by using a dial-up modem to access the ISP, routing through the CO 20, 22.

With standard telephony, each conventional telephone unit has a unique and fixed telephone number by which other callers can signal that telephone unit. In contrast, on the Internet a connected user is assigned a unique but temporary Internet address (IP address) – assigned only for a specific dial-up session. Similar to a telephone number, the IP address identifies the destination point, or the point on the entire data network to which the data is being sent. Accordingly, a second user can locate that first user during a specific dial-up session by identifying the first user's IP address. However, after that dial-up session terminates, the IP address is re-assigned to another user for a different dial-up session. Since the IP address assigned to a connected subscriber changes for each dial-up session, it is necessary for the Internet telephones to quickly and efficiently identify the other's temporary IP address for each Internet call. The process of transmitting, registering, and identifying the Internet addresses of each Internet telephone is referred to as a "call negotiation scheme."

CONFIDENTIAL

As discussed above, in order for the Internet telephones 16, 18 to communicate with one another over the Internet 12, a call negotiation scheme is required. Although either Internet telephone can initiate or receive an Internet telephone call, for illustrative purposes only, it will be assumed that the subscriber using the Internet telephone 16 will be the initiating caller, and the subscriber using the Internet telephone 18 will be the receiving party. Moreover, for illustrative purposes only, it will be assumed that the subscribers use dial-up modems to connect to the COs and then access the ISPs.

With reference to FIG. 2b, in one call negotiation scheme, an Internet telephone 16 transmits an identification code to a second Internet telephone 18 over the PSTN 14 during a voice telephone call, as indicated by dashed lines 32. Then the voice telephone call terminates, and a connection is established between the Internet telephone 16 and its ISP 28, as indicated by the solid line 34. A dial-up modem is used to connect to the CO 20 and then to access the ISP. The ISP 28 assigns an IP address to the Internet telephone 16. Once assigned, the IP address assigned to the connected subscriber for that particular dial-up session and the identification code can be stored in a network server 36, for example, in tabular form as illustrated in FIG. 3.

More specifically and as illustrated in FIG. 4, the network server 36 includes a processing unit 38, a memory unit 40, a data storage device 42, a network controller and interface 44, a display device 46, and an input device 48. The processing unit 38, which may be, for example, a personal computer commercially available from Hewlett-Packard Co., communicates with the various elements via a system bus 50. The memory unit 40 contains a database 52 which identifies, among other things, the identification code of each connected Internet telephone 16, 18 and the temporary IP address assigned to the connected Internet telephones. The database 52 provides the means for mapping the identification code to the appropriate IP address, wherein the identification code uniquely identifies and is permanently assigned to that Internet telephone. The data storage device 42 is used for long-term storage of information.

A valid identification code is required to place or receive telephone calls over the Internet 12 using that Internet telephone. Further, the database 52 may also contain such information as the

CONFIDENTIAL

Internet call features available to a subscriber. Moreover, another database, which can link to the network server 36, maintains subscriber information based on the identification code, such as region of sale, date of sale, and other data.

As shown in FIG. 5, the memory unit 40 includes an authorization module 54, an address/code registration module 56, an IP address query module 58, an address mapping module 60, and a channel establishment module 62. The network server 36 operates under the control of an operating system, such as the well-known UNIX operating system.

In operation, an IP address is assigned to the connected subscriber for a particular dial-up session by the ISP. The IP address is sent to the Internet telephone 16, whereupon the Internet telephone 16 sends the IP address and identification code to the authentication module 54 of the network server 36. The authentication module 54 verifies whether the identification code is valid.

Upon proper validation, the address/code registration module 56 responds by registering the IP address in the database 52 of the memory unit 40. In one embodiment of the invention, the address/code registration module 56 receives a register command signal to register the IP address in the memory unit 40.

Thus, when a search of the database 52 is performed using the transmitted identification code, the IP address query module 58 receives a search command signal and causes the address mapping module 60 to identify the IP address assigned to a subscriber. Next the channel establishment module 62 establishes a communication channel between the first Internet telephone 16 and the second Internet telephone 18. Then by periodically signaling the network server 36 to indicate the connection status of the Internet telephones 16, 18 and by updating the IP addresses stored in the database 52 for each connected Internet telephone 16, 18, a dynamic and accurate picture of the Internet telephone environment is continuously maintained. As such, an Internet telephone querying the network server 36 can determine whether a voice communication link or channel can be established with a particular subscriber using Internet facilities.

CONFIDENTIAL

According to an alternative embodiment of the call negotiation scheme, illustrated in FIG. 2c, the first and second Internet telephones 16, 18 can establish a communication channel over the Internet 12 without previously establishing the voice telephone call. In doing so, the first subscriber can avoid incurring the telephone charges associated with placing that voice call over the circuit switched telephone network 14. Here, it is assumed that the subscriber of the second Internet telephone 18 has prior knowledge of the first Internet telephone's 16 identification code. Further, the subscribers of the first and second Internet telephones 16, 18 may have pre-arranged a time to establish the communication link. For example, in this alternative call negotiation scheme at the pre-arranged time, the first Internet telephone 16 establishes a connection with its associated ISP 28 via the central office 20, whereupon the ISP assigns an IP address to that first Internet telephone. The identification code and IP address of the first Internet telephone 16 are then stored in the network server 36. While remaining connected to the Internet 12, the first Internet telephone 16 waits for the second Internet telephone 18 to locate and then establish an Internet telephony channel with said first Internet telephone. When the second Internet telephone 18 establishes a connection with its associated ISP 30 by routing through central office 22, the second Internet telephone transmits a search command signal to the network server 36 to search for the first Internet telephone's IP address. By pre-arranging the call time, the subscriber of the first Internet telephone 16 can limit the amount of time spent waiting for the second Internet telephone 18 to locate and then establish this communication link.

In an alternative manner of voice communication, illustrated in FIG. 2d, the subscriber may cause the Internet telephone 16 to place a call with a conventional telephone 64 which does not connect to the Internet 12. Here, the call may route via the PSTN 14, as indicated by dotted lines 32, or use the Internet 12, as indicated by solid lines. When using the Internet 12, the subscriber initiates the call using the Internet telephone 16, and the call routes through the CO 20 to the subscriber's ISP 28 which assigns an IP address to the Internet telephone 16. In response to receipt of the subscriber's incoming call, a gatekeeper 66 of an Internet Telephony Service Provider (ITSP) with which the subscriber is associated will determine the appropriate routing to an IP gateway (gateway) 68 serving the destination telephone 64. Accordingly, the call is routed over the Internet 12 to the appropriate IP gateway 68 which then connects the call via the PSTN 14 to the CO 70

CONFIDENTIAL

serving the destination telephone 64. It will be understood that the call can also route through the gatekeeper 66 and the gateway 68 to the PSTN 14, thereafter routing to the CO 70 serving the destination telephone 64.

In yet a further alternative call negotiation scheme, with reference to FIG. 2è, a first Internet telephone 16 can establish a communication channel with a second Internet telephone 18 without having to perform a search of the database 52. In this call negotiation scheme, a connection is established between a first Internet telephone 16 and its associated ISP 28, whereupon the ISP assigns an IP address to that first Internet telephone. Then the first Internet telephone 16 establishes a communication channel with the second Internet telephone 18, the channel routing via the Internet 12 and PSTN 14 by way of the gateway 68, as described previously and indicated by dashed lines 72. Using this communication channel, the first Internet telephone 16 sends its IP address to the second Internet telephone 18. Next the second Internet telephone 18 transmits an acknowledgement signal back to the first Internet telephone 16 and stores the IP address into memory. Upon transmitting the acknowledgement signal, the communication link 72 between the second Internet telephone 18 and the Internet 12 disconnects. While remaining connected to the Internet 12, the first Internet telephone 16 waits for the second Internet telephone 18 to locate and then establish an Internet telephony channel with said first Internet telephone, indicated by solid lines 74, using the IP address stored in the second Internet telephone's memory.

FIG. 6 shows one embodiment of the Internet telephone 16, and FIG. 7 depicts the basic components of said Internet telephone. As illustrated in FIGS. 6 and 7, the Internet telephone 16 is preferably a stand-alone device which includes a user interface 76, a voice interface 78, a converter 80, a digital signal processor unit 82 and associated logic, a memory unit 84, and a network interface 86. The Internet telephone 16 can perform voice over Internet functions, such as scanning, voice compression, data packetization, and network interfacing.

The user interface 76 allows a user to interact with the Internet telephone 16. The user interface 76 includes, among other features, a keypad 88 for dialing numbers or activating certain call functions and an audible indicator for indicating operating characteristics and/or instructions,

CONFIDENTIAL

such as new telephone messages, the call status, or selectable options from a telephonic voice menu, including available call features. The user interface 76 may also include a visual display 90 for displaying such operating characteristics. In one embodiment, the Internet telephone 16 has a single means for activating a call function. For example, by depressing a programmable button 92 or moving a switch, the Internet telephone 16 can perform a call negotiation scheme, as discussed above, or perform a diagnostic test to verify Internet connectivity, or perform a diagnostic test to troubleshoot voice quality-of-service problems, or activate the telephonic voice menu. Although the Internet telephone 16 is shown as having single button activation 92 of call functions, it will be understood that the Internet telephone may also use voice or video activation. Similarly, the language spoken in voice menu can be translated to another desired language by using a single activation means.

The voice interface 78, in accordance with conventional practice, is a speaker or microphone located on the telephone handset 94 and/or base 96. Speech signals from the microphone 78 are transmitted to a converter 80 that provides the conversion of analog voice into digital signals. Specifically, the analog voice is digitized, by means commonly known in the field, and the digital data are transmitted to a digital signal processor unit (DSP unit) 82 which provides call processing and voice processing.

The DSP unit 82 and associated logic are supported by voice processing software and a memory unit 84, described in greater detail below. The DSP unit 82 includes a digital signal processor and other control processing units. The DSP unit 82 performs call signaling and control, voice compression and decompression, and packetization and depacketization functions.

The memory unit 84 includes programmable and dynamic memory, such as electrically erasable programmable read-only memory (EEPROM) and dynamic random access memory (DRAM) devices. The memory unit 84 stores the call negotiation algorithms (described in greater detail below) which the DSP 82 follows, as well as provides temporary storage of incoming data not yet processed by the DSP. In addition, the identification code, as described above, is stored in the memory unit 84.

CONFIDENTIAL

As illustrated in FIG. 8, the memory unit 84 includes a call initialization module 100, a call response module 102, an Internet telephone compatibility module 104, a network selection module 106, a code transmission/receipt module 108, and an IP address transmission/receipt module 110. The memory unit 84 communicates with the various elements via a system bus 112. Each element will be described in greater detail below. Moreover, the memory unit 84 operates under the control of an operating system 114 which allows the memory unit to perform multiple tasks, simultaneously.

The network interface 86 allows transmission and reception of voice packets to and from the Internet telephone 16. For example, the Internet telephone 16 has telephone and/or LAN connectivity. Although the Internet telephone 16 is shown in FIG. 9 as including four means for network connection 98, one of which allows for connection to the PSTN 14, it will be understood that the Internet telephone may include more than four network connectors or as few as two network connectors. The means for network connection 98 may include, but is not limited to, RJ11 ports, RJ45 ports, RS-232 ports, and USB.

Additionally, while the Internet telephone 16 in FIGS. 6 and 7 combine the user and voice interfaces 76, 78, the converter 80, the DSP unit 82 and associated logic, the memory unit 84, and the network interface 86 into a single device, one skilled in the art will appreciate that such components can be combined or separated on distinct devices without significantly affecting the functionality of the Internet telephone.

FIG. 10 shows the steps of an exemplary embodiment of a call negotiation scheme to establish a voice communication channel over the Internet 12 between a first Internet telephone 16 and a second Internet telephone 18, as it relates to FIG. 2b.

The block 205 indicates that a communication channel is established between the first and second Internet telephones 16, 18, wherein the communication channel typically uses a circuit-switched telephone network 14. Specifically, the call initialization module 100 of the first Internet telephone 16 places a call to the second Internet telephone 18 via the PSTN 14. The call response

CONFIDENTIAL

module 102 can then determine whether a connection has been established between the parties. This step also serves as confirmation to the first subscriber that the second subscriber is available to establish voice communication over the Internet 12.

At decision block 210, it is determined whether the Internet telephones 16, 18 can support an Internet telephone call. In one embodiment of the invention, the Internet telephone compatibility module 104 will make this determination if it detects the other station's capability to do so. For example, the Internet telephone compatibility module 104 can detect the other station's capability to support Internet telephony by signaling the destination station (using a signal generator) and then receiving an appropriate response signal, or acknowledgement (using a signal detector). It will be understood that the determination of whether the stations can support Internet telephony can be performed through dual tone multi-frequency (DTMF) signaling.

If the answer to decision block 210 is no, then the process moves to block 215 wherein the subscriber is made aware that the communication channel must route over a circuit switched telephone network 14 since the other station cannot support Internet telephone calls. Otherwise, the process moves to block 220 where the code transmission/receipt module 108 of the first Internet telephone 16 transmits a code, such as its identification code, which uniquely identifies that first station. For example, the subscriber may depress the programmable button 92 to trigger the code transmission/receipt module 108 to transmit the code.

Next at block 225, the second Internet telephone 18 receives the code and stores it into the memory unit 40. Having stored the code, the process proceeds to block 230. Here, the Internet telephones 16, 18 disconnect the communication channel (i.e., disconnect the voice link connecting the Internet telephones to the PSTN) and attempt to connect to their respective ISP 28, 30, for example, using the call initialization modules 100.

At decision block 235, it is determined whether or not the Internet telephones 16, 18 have successfully connected to their respective ISP 28, 30. If so, the process proceeds to block 240 where the Internet telephones 16, 18 are assigned IP addresses by their ISPs 28, 30. The assigned IP

CONFIDENTIAL

addresses are then stored in the memory unit 40. Otherwise, the process moves to decision block 245, wherein it is decided whether or not to re-attempt connecting to the ISP since, due to incorrect "userid" or password or other reasons, the ISP was unavailable. The non-connected Internet telephone(s) will make a predetermined number of attempts to connect to the ISP, the process looping back to decision block 235 for each attempt. If a connection is not successfully established after making the predetermined number of attempts, the Internet telephone indicates the failure to the subscriber (block 250).

Having failed to successfully establish connections to the ISPs 28, 30, the Internet telephones 16, 18 can be programmed to then automatically establish a voice telephone call based on predetermined criteria. For example, a subscriber may have programmed a prioritized list of telephony service providers, such as AT&T, MCI, or 10-10-xxx dial-around services, into the memory unit 40 based upon quality-of-service and/or cost preferences. Accordingly, based on the prioritized list, the network selection module 106 of the first Internet telephone 16 will automatically select the telephone carrier listed as "highest priority" and establish a voice call over that carrier's facilities. But if such carrier facilities are unavailable, the Internet telephone 16 will select the next listed telephone carrier to establish the voice call.

At block 255, the IP address assigned to the connected Internet telephone 16 by the ISP 28, as well as the corresponding code, are sent by the IP address transmission/receipt module 110 to the authentication module 54 of the network server 36. Upon proper validation of the code, the address/code registration module 56 responds by registering the IP address and code in the database 52 maintained by the network server 36.

Next at block 260, a search request signal from the second Internet telephone 18 is received by the network server 36. The network server 36 responds to the search request signal by transmitting a search command to the address mapping module 60, wherein the database 52 is searched for the code transmitted by the first Internet telephone 16 at block 220. By searching the database 52 using the first Internet telephone's code, the IP address can be identified so that the second Internet telephone 18 can transmit call setup signals to establish an Internet telephony link.

CONFIDENTIAL

In an alternative embodiment, the IP addresses assigned to both connected Internet telephones 16, 18, as well as their corresponding codes, are sent to the authentication module 54, wherein the mapping function can be performed for both Internet telephones.

At decision block 265, it is determined whether or not the search is successful. If the answer to this determination is no, then the process moves to decision block 270 where it is decided whether or not to re-attempt searching the database 52. A predetermined number of search attempts will be made on the database 52, the process looping back each time to decision block 265. If a search is not successful after making the predetermined number of attempts, the Internet telephone 18 indicates the failure to the subscriber (block 250).

If the answer to the determination at decision block 265 is yes, the process proceeds to decision block 275. Here, the second Internet telephone 18 has transmitted call setup signals to establish an Internet telephony link. However, it must be determined whether the channel establishment module 62 has successfully established such link. If so, the process moves to block 280 where the first and second Internet telephones 16, 18 can conduct real-time voice conversations over the Internet 12. Otherwise, the process moves to decision block 285 where it is decided whether or not to re-attempt establishing the Internet telephony link. A successful link will be attempted a predetermined number of times, the process looping back at each attempt to decision block 275. If such link is not established after the predetermined number of attempts, the Internet telephones 16, 18 indicate the failure to the subscribers (block 250). In one embodiment, having failed to successfully establish the Internet telephony link, the Internet telephones 16, 18 can be programmed to automatically select a telephony service provider based on a prioritized list. The network selection module 106 of the first Internet telephone 16 will then place a call using the telephone carrier listed as "highest priority."

With reference to FIGS. 2c and 11, in an alternative embodiment of the call negotiation scheme, the first and second Internet telephones 16, 18 can establish a voice communication channel over the Internet 12 without first establishing the voice call of block 205. In doing so, the first subscriber can avoid incurring the telephone charges associated with placing that voice call over the

CONFIDENTIAL

circuit switched telephone network 14.

The block 305 indicates that the first Internet telephone 16 establishes a communication channel with its associated ISP 28. Specifically, the call initialization module 100 of the first Internet telephone 16 accesses the ISP 28 by using a dial-up modem. The call response module 102 can then determine whether a connection has been established between the first Internet telephone 16 and ISP 28. After connecting to the ISP 28, the first Internet telephone 16 will place subsequently received telephone calls "on hold" so as not to interfere with the call negotiation process.

At block 310, the Internet telephone 16 is assigned an IP address. Next the process flows to block 315 where the code and IP address transmission/receipt modules 108, 110 send the IP address and the code for the Internet telephone 16 to the authentication module 54 of the network sever 36. Upon proper validation of the code, the address/code registration module 56 responds by registering the IP address and code in the database 52. The database 52 provides the mapping of the code to the corresponding IP address. The first Internet telephone 16 remains connected to the ISP 28 while waiting for the second Internet telephone 18 to establish an Internet telephony link. As discussed above, by pre-arranging the call time, the subscriber of the first Internet telephone 16 can minimize the time spent waiting for the second Internet telephone 18 to locate and then establish this communication link.

Next at block 320, the second Internet telephone 18 connects to its associated ISP 30. Here it is assumed that the subscriber of the second Internet telephone 18 has prior knowledge of the code for the first Internet telephone 16. Thus, the subscriber can dial the code via the user interface 52, causing the second Internet telephone 18 to transmit a search request signal to the network server 36. Responsive to receipt of the subscriber's transmission of the search request signal, the network server 36 transmits a search command to the address mapping module 60, wherein the database 52 is searched for the first Internet telephone code (block 325).

At decision block 330, it is determined whether the database search was successful. By successfully searching the database 52 using the code, the IP address of the first Internet telephone

CONFIDENTIAL

16 can be identified. However, if the search was not successful, the process moves to decision block 335. Here it is decided whether or not to re-attempt searching the database 38. The search will be performed a predetermined number of times when prior search attempts were unsuccessful, the process looping back at each attempt to decision block 330. If such search is unsuccessful after making the predetermined number of attempts, the second Internet telephone 18 indicates the failure to the subscriber (block 340).

If the answer to the determination at decision block 330 is yes, the process flows to decision block 345, wherein the second Internet telephone 18 has transmitted a call setup signal to establish the Internet telephony link. However, it must be determined whether the channel establishment module 62 has successfully established such Internet telephony link. If so, the process moves to block 350 wherein the first and second Internet telephones 16, 18 are connected through the ISPs 28, 30, and the first and second subscribers can conduct real-time voice conversations over the Internet 12. Otherwise, the process moves to decision block 355 where it is decided whether or not to re-attempt establishing the Internet telephony channel.

A successful Internet telephony link will be attempted a predetermined number of times, the process looping back at each attempt to decision block 345. If such link is not established after the predetermined number of attempts, the Internet telephones 16, 18 indicate the failure to the subscribers (block 340). Substantially similar to the call negotiation scheme of FIG. 10, the Internet telephones 16, 18 can be programmed to then automatically select a telephony service provider based on a prioritized list and establish a voice telephone call.

With reference to FIGS. 2d and 12, in another embodiment of the call negotiation scheme, the Internet telephone 16 can establish a voice communication channel with a conventional telephone 64 that does not connect to the Internet 12. In doing so, the packet switched network of the Internet 12 can integrate with the circuit switched telephone network 14. Such an integration of networks can allow a subscriber to communicate with another telephony user located anywhere else in the world without having to pay the long distance charges associated with making a telephone call using the PSTN 14.

CONFIDENTIAL

The block 405 indicates that a subscriber will decide whether to establish a communication channel between the Internet telephone 16 and the destination telephone 64 over the Internet 12 or using the PSTN 14. If the subscriber decides to use the PSTN 14, then at block 415, the Internet and conventional telephones 16, 64 are linked and the call routed via the PSTN through the COs 20, 70, as indicated by dotted lines 32. Otherwise, the process moves to block 420, wherein a communication channel is established between the Internet telephone 16 and its associated ISP 28, as indicated by solid lines.

Next at block 425, the code transmit/receipt module 108 of the Internet telephone 16 transmits a code, such as the telephone number, which uniquely identifies the destination telephone 64. At block 430, the Internet telephone 16 connects with the gatekeeper 66, wherein the gatekeeper stores the destination telephone number into its database 116. Based on the code, at block 435 the gatekeeper 66 will determine the appropriate routing to the gateway 68 serving the destination telephone 36. Accordingly, a communication path is established between the Internet telephone 16 and the destination telephone 64 whereby the communication path routes over the Internet 12 to the appropriate gateway 68 (block 440). Then the communication path connects via the PSTN 14 to the CO 70 serving said destination telephone. By using this communication path, the Internet telephone 16 and the destination telephone 70 can conduct real-time voice conversations over the Internet 12 (block 445).

With reference to FIGS. 2e and 13, in another embodiment of the call negotiation scheme, the first and second Internet telephones 16, 18 can establish a voice communication channel over the Internet 12 without performing a search of the database 52.

The block 505 indicates that a communication channel is established between the first Internet telephone and its associated ISP 28. Specifically, the call initialization module 100 of the first Internet telephone 16 accesses the ISP 28 by using a dial-up modem. The call response module 102 can then determine whether a connection has been established between the first Internet telephone 16 and the ISP 28. After connecting to the ISP 28, the first Internet telephone 16 will

CONFIDENTIAL

place subsequently received telephone calls "on hold" so as not to interfere with the call negotiation process.

At block 510, the ISP 28 assigns the first Internet telephone 16 an IP address which is sent to the first Internet telephone 16 and stored by the IP address transmission/receipt module 110. Next the process flows to block 515 where the first Internet telephone 16 establishes a connection with the second Internet telephone 18. Substantially similar to the call negotiation scheme of FIG. 12, the first Internet telephone 16 connects with the gatekeeper 66, wherein the gatekeeper 66 stores the destination telephone number in its database 116. Based at least in part on the destination telephone number, the gatekeeper 66 will determine the appropriate routing to the gateway 68 serving the second Internet telephone 18. Then a connection is established over the Internet 12 and the PSTN 14, by way of the gateway 68 as indicated by the dashed lines 72.

At decision block 520, it is determined whether the stations can support an Internet telephone call. Substantially similar to the call negotiation scheme of FIG. 10, in one embodiment of the invention, the Internet telephone will make this determination if it detects the other station's capability to do so. For example, the Internet telephone compatibility module 104 can detect the other station's capability to support Internet telephony by signaling the destination station and then receiving an appropriate response signal, or acknowledgement.

If the answer to decision block 520 is no, then the process moves to block 525 wherein the subscriber is made aware that the communication channel must route over a circuit switched telephone network 14 since the other station cannot support Internet telephone calls. Otherwise, the process moves to block 530 where the code transmission/receipt module 108 of the first Internet telephone 16 transmits a code, such as its IP address, to the second Internet telephone 18.

Next at block 535, the second Internet telephone 18 stores the code in the memory unit 84. The code transmission/receipt module 108 of the second Internet telephone 18 then transmits an acknowledgement signal back to the first Internet telephone 16. In one embodiment of the invention, the acknowledgement signal is transmitted back to the Internet telephone 16 without having to take

CONFIDENTIAL

the second Internet telephone 18 off-hook, thereby the first subscriber can avoid incurring the telephone charges associated with placing that call. For example, the Internet telephone can identify the call as being initiated from another Internet telephone by using out-of-band signaling, such as SS7 signaling.

In response to receipt of the acknowledgement signal, at block 540, the first Internet telephone 16 sends call setup signals to establish the Internet telephony link. For example, the network selection module 106 transmits the call setup signals, wherein the Internet 12 is selected to establish a communication channel between the first and second Internet telephones 16, 18. However, it must be determined whether such link has been successfully established (decision block 545). If so, the process moves to block 550 where the first and second Internet telephones 16, 18 can conduct real-time voice conversations over the Internet 12.

Otherwise, the process moves to decision block 555, wherein it is decided whether or not to re-attempt establishing the Internet telephony link. A successful link will be attempted a predetermined number of times, the process looping back at each attempt to decision block 545. If such link is not established after the predetermined number of attempts, the Internet telephones 16, 18 indicate the failure to the subscribers (block 560). In one embodiment, having failed to successfully establish the Internet telephony link, the Internet telephones 16, 18 can be programmed to automatically select a telephony service provider based on a prioritized list and then establish a voice telephone call. Substantially similar to the call negotiation schemes of FIGS. 10 and 11, the Internet telephones 16, 18 can be programmed to then automatically select a telephony service provider based on a prioritized list and establish a voice telephone call.

The present invention concerns a method and communication system for providing voice communication over the Internet. It is within the scope of the present invention that the call negotiation schemes of FIGS. 10-13 are performed by activating a single means. While the invention has been described in detail with reference to the preferred embodiments thereof, it will be apparent to one skilled in the art that various changes and modifications can be made and equivalents employed without departing from the present invention.

CONFIDENTIAL

We claim:

1. A method for establishing voice communication between a first station and a second station using a first network and a second network, the method comprising the steps of:
receiving a data network address for a first station by a second station via a first communication channel routing over a first network, the data network address uniquely identifying the first station;
disconnecting from the first communication channel, the first station and the second station; and
causing a second communication channel for voice communication over the second network between the first station and the second station, using the data network address received at said second station.
2. The method of Claim 1, wherein the first network includes data network and an IP gateway providing access to a circuit switched network serving the second station.
3. The method of Claim 2, wherein the step of receiving a data network address for a first station by a second station further comprises the steps of:
identifying the IP gateway serving the second station; and
in response to identifying the IP gateway, determining a routing between the second network and said second station.
4. The method of Claim 1, further comprising the step of:
storing the data network address into a memory associated with the second station, the memory removing the data network address after disconnecting the second communication channel.
5. The method of Claim 1, further comprising the step of:
prior to performing the step of disconnecting the first communication channel, determining whether the first and second stations can support a communication channel for voice

CONFIDENTIAL

communication over the second network; and

performing said disconnecting step between the second station and the first network if the first and second stations support voice communication over the second network.

6. The method of Claim 5, wherein the step of determining whether the first and second stations can support a communication channel for voice communication over the second network further comprises the steps of:

signaling the second station from the first station; and

determining whether the first station receives an appropriate response signal from said second station.

7. The method of Claim 1, further comprising the steps of:
determining whether the first and second stations have established the second communication channel over the second network; and

if it is determined that the first and second stations have not established said second communication channel over the second network, then automatically establishing a third communication channel between said first and second stations using a circuit switched network.

8. The method of Claim 7, wherein the step of establishing the third communication channel between said first and second stations using a circuit switched network further comprises the step of:

selecting a service provider for the third communication channel from a provider list associated with the first station.

9. The method of Claim 1, wherein the first station sends automatically the data network address to a second station via a first communication channel in response to a single activation means.

10. The method of Claim 9, wherein the single activation means is a programmable button depression signal.

CONFIDENTIAL

11. The method of Claim 9, wherein the single activation means is a voice signal.
12. The method of Claim 9, wherein the steps of disconnecting the first and second stations from the first communication channel and causing a second communication channel for voice communication over the second network are performed automatically after sending the data network address to the second station.
13. The method of Claim 1, wherein the first station and the second station are telephonic devices.
14. The method of Claim 1, wherein the second network is a data network.
15. The method of Claim 1, wherein the second network is routed over the Internet.
16. A method for establishing voice communication between a first station and a second station using data networks, the method comprising the steps of:
 - receiving a code from a first station at a second station, wherein the code uniquely identifies the first station;
 - establishing a communication channel between the first station and a data network having a network server, the network server assigning a data network address to the first station;
 - identifying the data network address of the first station based at least in part upon the code; and
 - establishing a communication channel between the first station and the second station for voice communication over the data network, using the data network address of said first station.
17. The method of Claim 16, further comprising the steps of:
 - storing the code and the data network address into a memory; and
 - identifying the data network address of the first station by searching the memory

CONFIDENTIAL

for the code.

18. The method of Claim 16, further comprising the steps of:
determining whether the code is invalid; and
disconnecting the communication channel between the first station and the data network if the code is invalid.
19. The method of Claim 16, further comprising the steps of:
determining whether the first and second stations can support a communication channel for voice communication over the data network; and
wherein the step of performing said establishing step between the first station and the data network is performed only if the first and second stations can support a communication channel for voice communication over the data network.
20. The method of Claim 16, further comprising the steps of:
determining whether the first and second stations have established a communication channel over the data network; and
if it is determined that the first and second stations have not established a communication channel over the data network, then automatically establishing a communication channel between said first and second stations using a circuit switched network.
21. The method of Claim 20, wherein the step of establishing a communication channel between said first and second stations using a circuit switched network further comprises the step of:
selecting a service provider for the communication channel from a provider list associated with the first station.
22. The method of Claim 16, wherein the first station connects to the data network automatically in response to a single activation means.

CONFIDENTIAL

23. The method of Claim 22, wherein the single activation means is a programmable button depression signal.

24. The method of Claim 22, wherein the single activation means is a voice signal.

25. In a data network system, a method for establishing a voice communication channel between a first station and a second station, the method comprising the steps of:

receiving a code by a first station at a network server, the code uniquely identifying a second station;
identifying a data network address of the first station based at least in part upon the code; and
causing a communication channel between the first station and the second station to be established for voice communication through the data network, using the data network address of said first station.

26. The method of Claim 25, further comprising the steps of:
storing the data network address into a memory; and
identifying the data network address of the first station by searching the memory for the code.

27. The method of Claim 26, wherein the step of searching the memory for a code further comprises the steps of:

transmitting the code identifying the first station by the second station; and
transmitting a search request signal by the second station, the search request signal causing said memory to be searched.

28. A method for establishing voice communication between a first station and a second station using data and circuit switched networks, wherein the second station is not linked to the data network, the method comprising the steps of:

determining whether to establish a communication channel for voice

CONFIDENTIAL

communication over the circuit switched network; and

if so, then establishing a telephonic connection between the first and second stations over the circuit switched network if it is determined that the communication channel should be established over the circuit switched network,

else triggering a single activation means wherein the first station automatically establishes a communication channel between the first and second stations for voice communication over the data and circuit switch networks.

29. The method of Claim 28, wherein the step of establishing the communication channel between the first station and the second station over the circuit switched network further comprises the step of:

selecting a service provider for the communication channel from a provider list associated with the first station.

30. A first station for initiating voice communication with a second station over a first network and a second network, the first station being a telephonic device comprising:

a storage medium having stored therein a plurality of programming modules including a code module and a call initialization module; and

a single activation means for causing the code module to transmit a code when the single activation means has been activated, the code routing over a first network, wherein the call initialization module of a second station to transmit an establish-communication-channel command which causes a communication channel to be established between the first and second stations over a second network based at least in part on the code, and if said single activation means has not been activated, the communication channel being established between the first and second stations over a circuit switched network.

31. The first station of Claim 30, wherein the code module transmits a code uniquely identifying the first station.

CONFIDENTIAL

32. The first station of Claim 30, wherein the storage medium further comprises a response module, the response module receiving a response signal from the second station wherein the call initialization module of the first station to transmit an establish-communication-channel command for enabling a communication channel to be established between the first and second stations over the second network.

33. The first station of Claim 30, wherein the first network includes a data network and an IP gateway providing access to a circuit switched network serving the second station.

34. The first station of Claim 30, further comprising:
a compatibility module for determining whether the second station supports a communication channel for voice communication over the second network, the compatibility module having a signaling unit and a detector unit.

35. The first station of Claim 30, further comprising:
a network selection module for establishing a communication link with the second station if it is determined the communication channel is not established over the second network, said communication link to be established over a circuit switched network.

36. The first station of Claim 35, wherein the communication link being established based on a provider list associated with said network selection module.

37. The first station of Claim 30, wherein the second network is a data network.

38. The first station of Claim 30, further comprising a user interface unit located at the first station, the user interface unit for indicating and selecting a calling feature option which said first station performs.

39. The first station of Claim 38, wherein the user interface unit accesses a network server for modifying the calling feature option which the first station performs.

CONFIDENTIAL

40. The first station of Claim 38, wherein the user interface is an interactive voice response application.

41. The first station of Claim 38, wherein the user interface is a visual display unit.

42. A first station for responding to an offer by a second station to establish voice communication, the first station being a telephonic device comprising:

a compatibility module receiving an offer by a second station to establish voice communication, the compatibility module for determining whether the second station supports voice communication over a data network, wherein the offer includes a code uniquely identifying said second station; and

a call initialization module for establishing a communication channel with the second station, the call initialization module to automatically transmit an establish-communication-channel command which causes a communication channel to be established between the first and second stations over a data network based at least in part on the code if it is determined that said second station supports voice communication over the data network.

43. A network server located on a data network for providing voice communication between a first station and a second station over the data network, the network server mapping a code to a data network address, the network server comprising:

a storage medium having stored therein a plurality of programming modules including a registration module, an address query module, and an address mapping module, wherein

the registration module registers a code and a data network address into a memory in response to a register command signal, the code uniquely identifying a first station and the data network address assigned to said first station when connected to a data network,

the address query module for causing a search to be performed on the memory, the search for the code performed in response to a search command signal, and

CONFIDENTIAL

the address mapping module for identifying the data network address assigned to the first station based on a result of the search; and

a channel establishment module for establishing a communication channel between the first station and a second station, the communication channel supporting voice communication over the data network.

44. The network server of Claim 43, further comprising:
an authentication module for determining whether the code is invalid.

45. The network server of Claim 43, wherein the memory having stored calling feature information and identifying a calling feature available to the first and second stations.

46. The network server of Claim 43, wherein the first station and the second station are telephonic devices.

CONFIDENTIAL

ABSTRACT

A method and system are disclosed in which an Internet subscriber can establish real-time voice conversations over the Internet. By performing a call negotiation scheme to identify and locate the other calling party, an Internet telephone can establish a voice communication channel over the Internet to a telephony or computer device.

1. A method for establishing a real-time voice communication channel over the Internet, comprising the steps of: identifying a calling party; locating the calling party; and establishing a voice communication channel over the Internet between the calling party and a telephony or computer device.

CONFIDENTIAL

FIG. 1 -- Prior Art

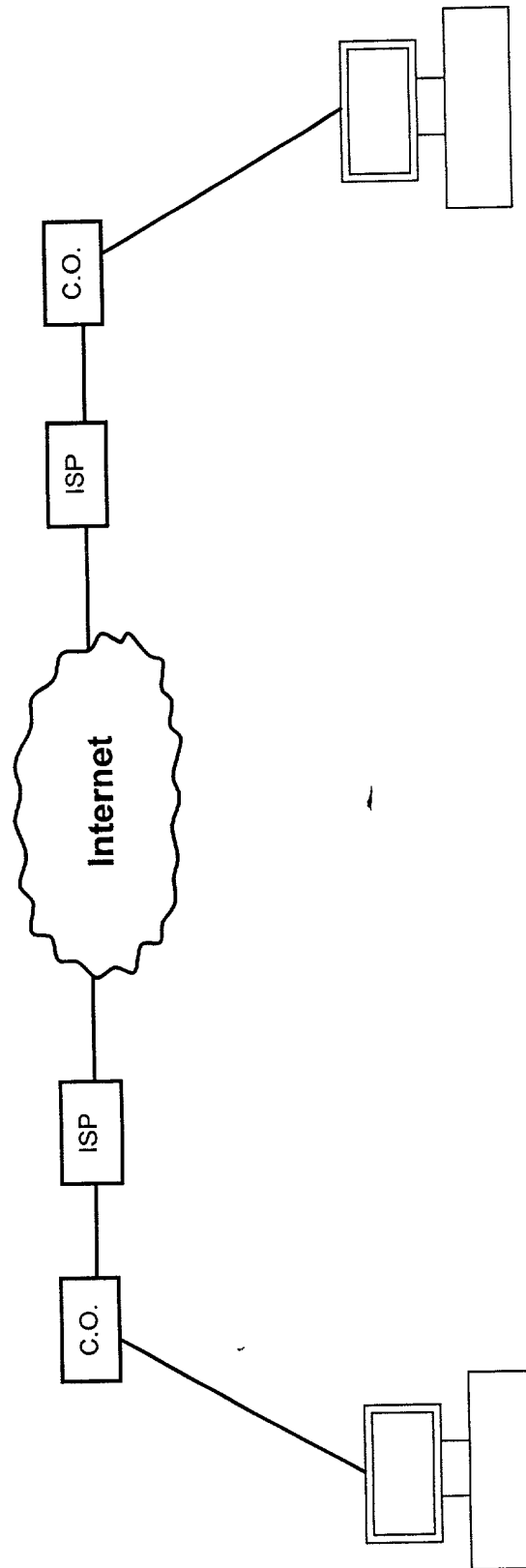


FIG. 2a

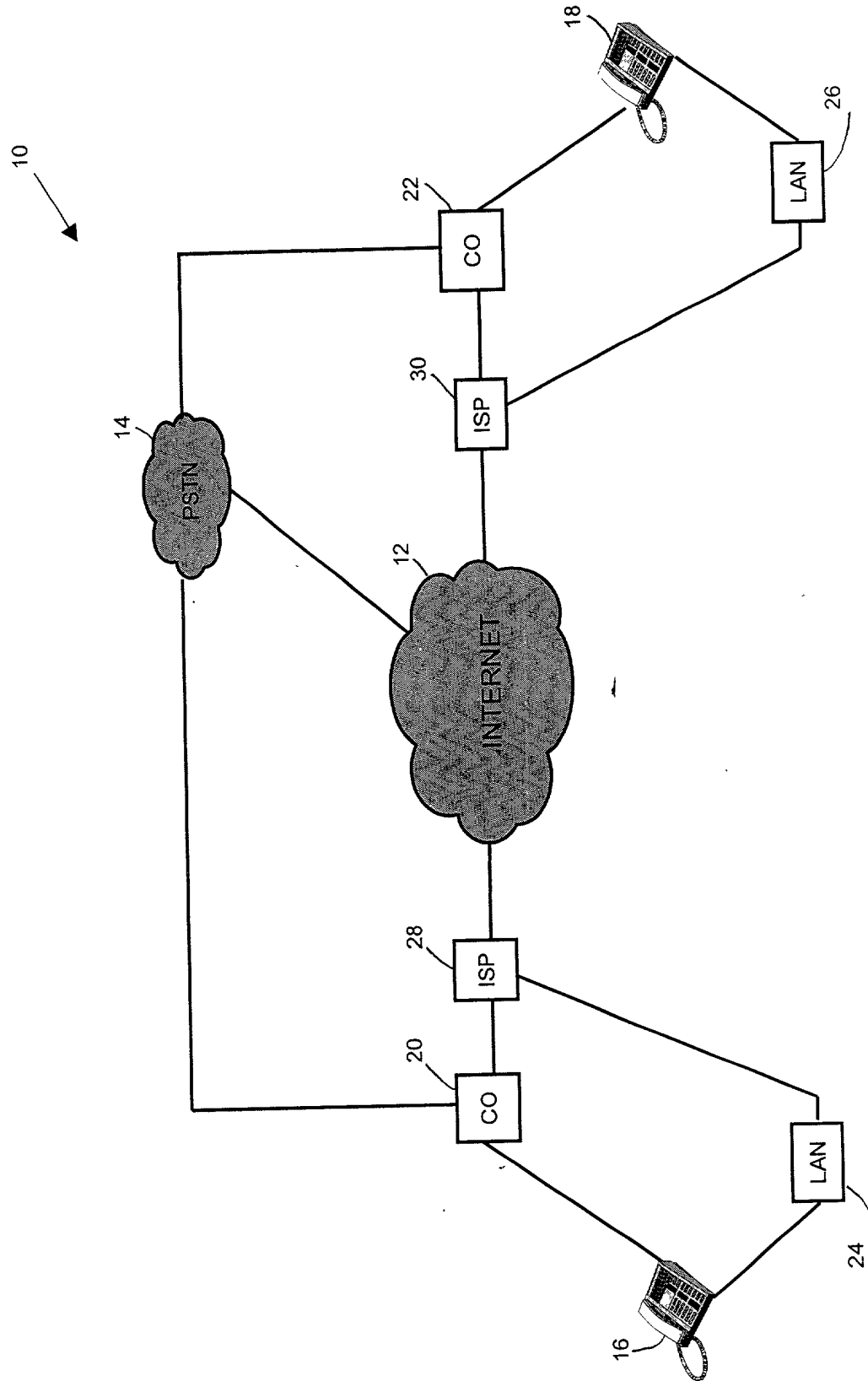


FIG. 2b

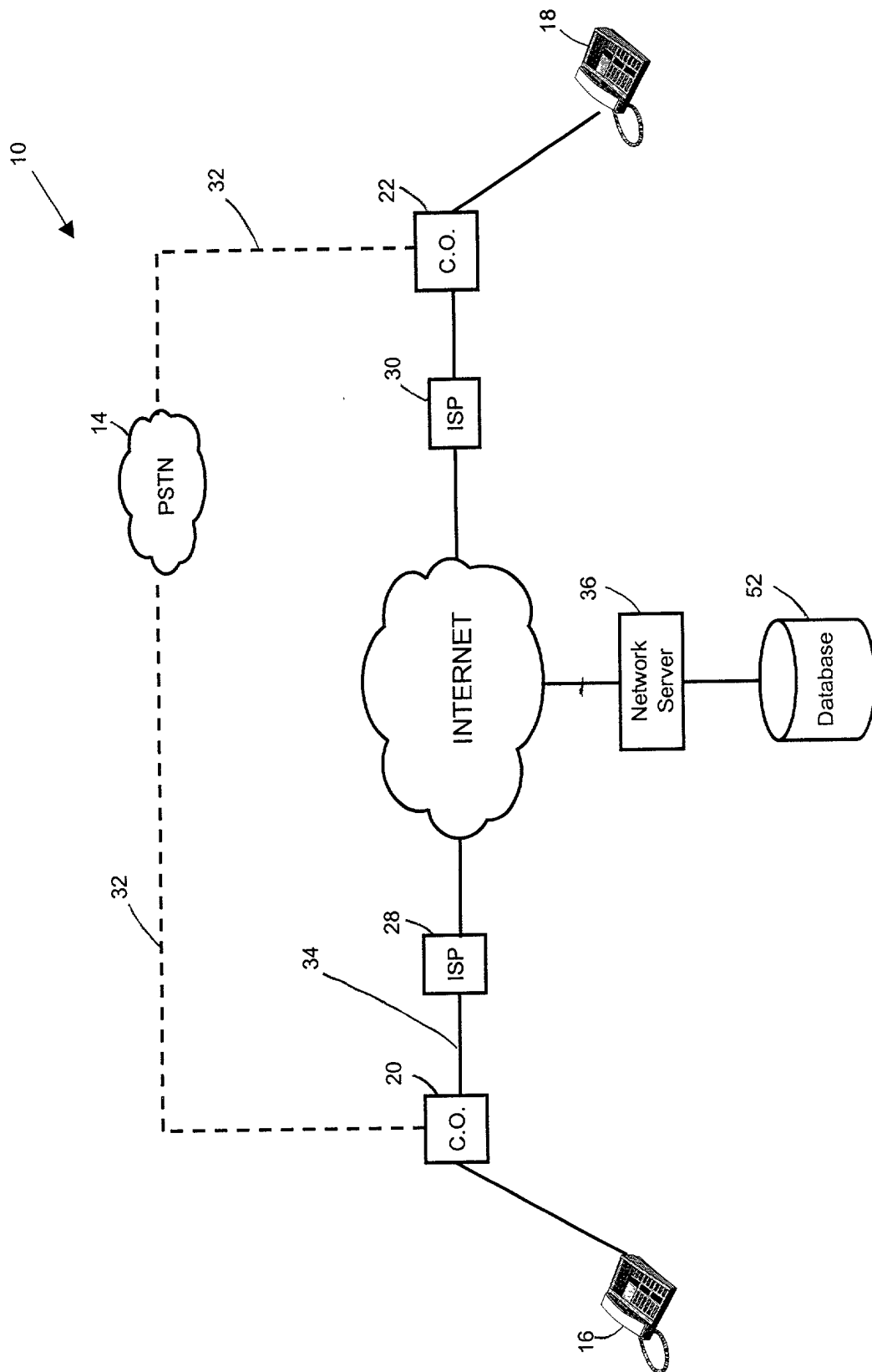


FIG. 2c

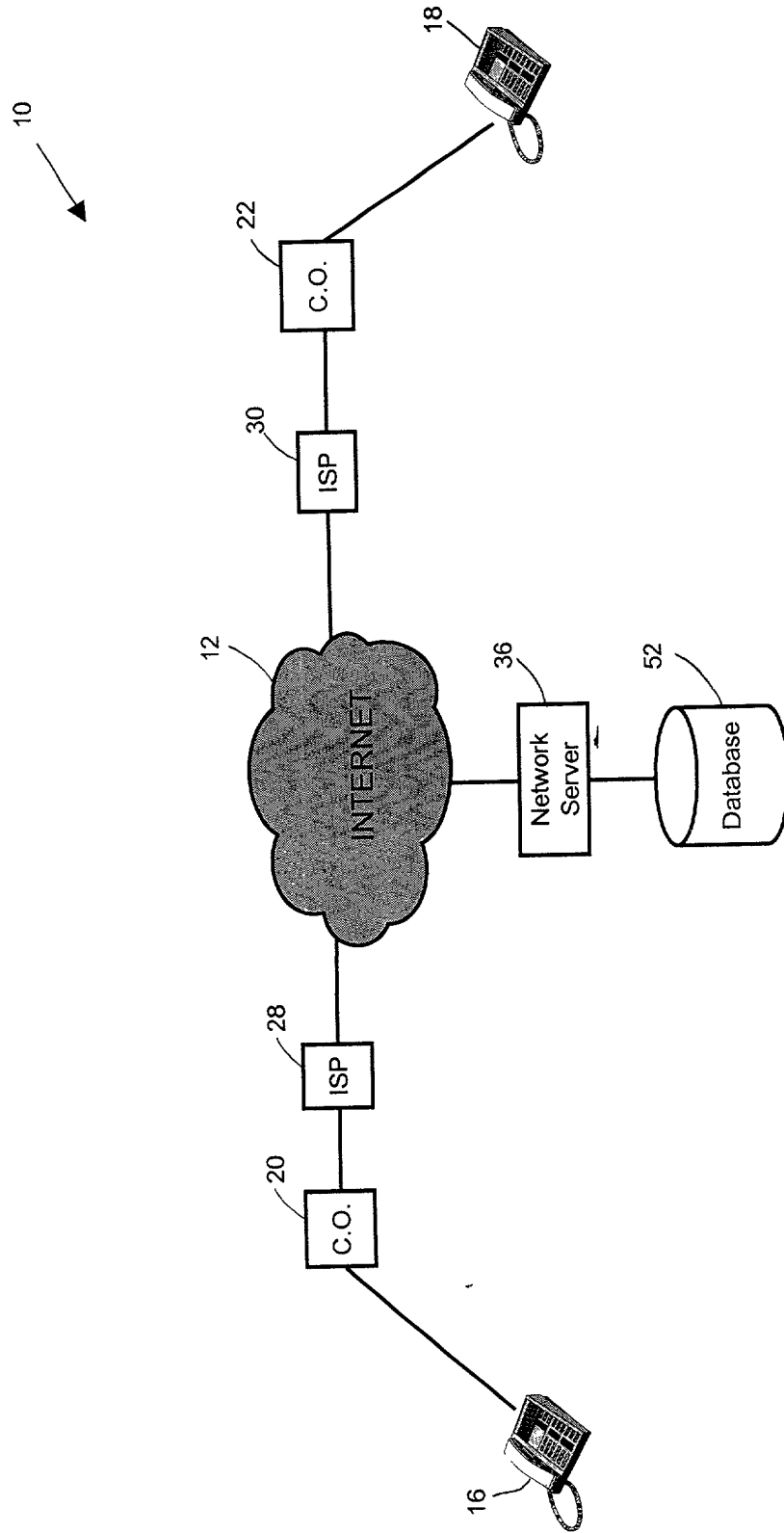


FIG. 2d

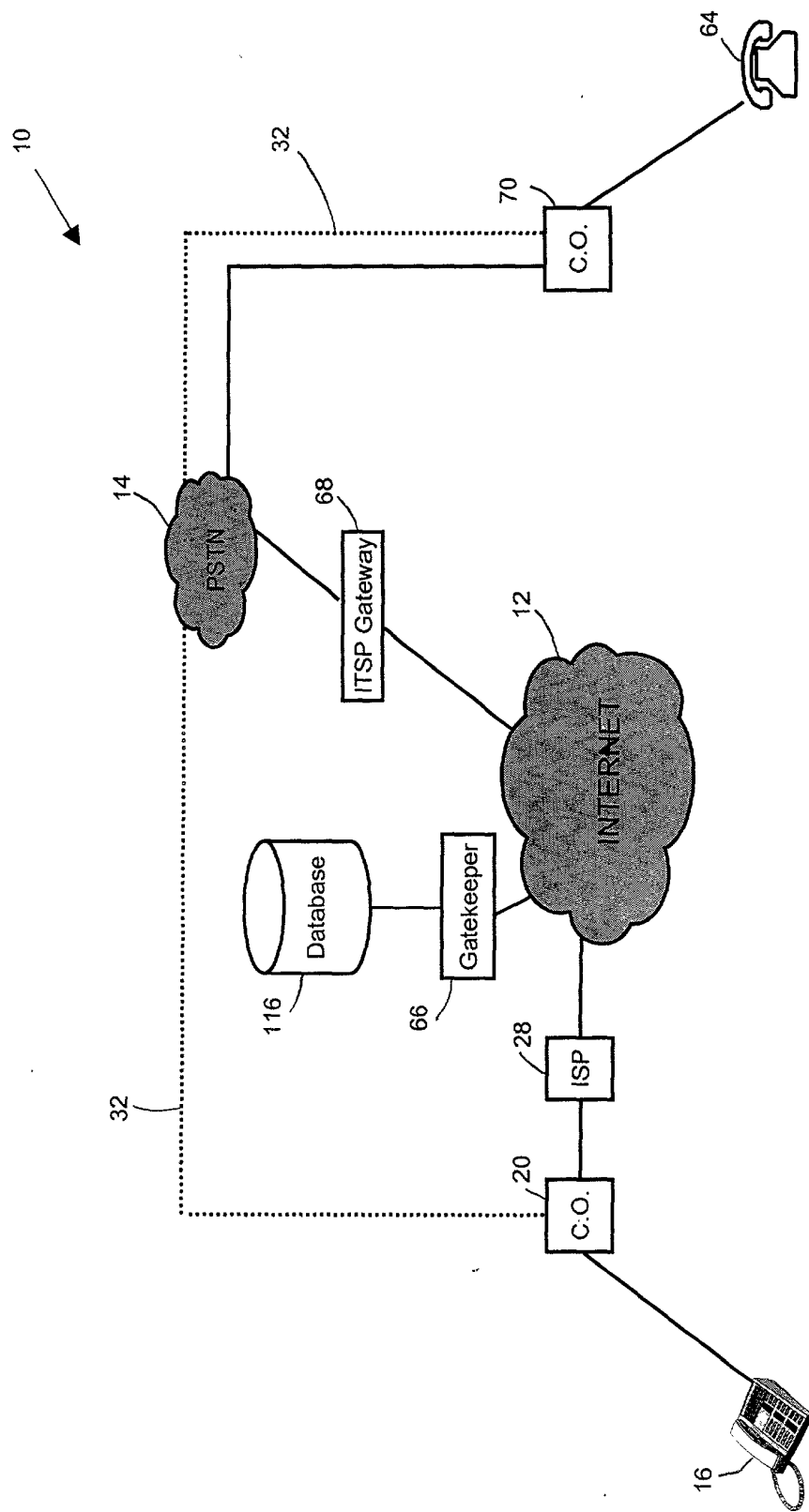


FIG. 2e

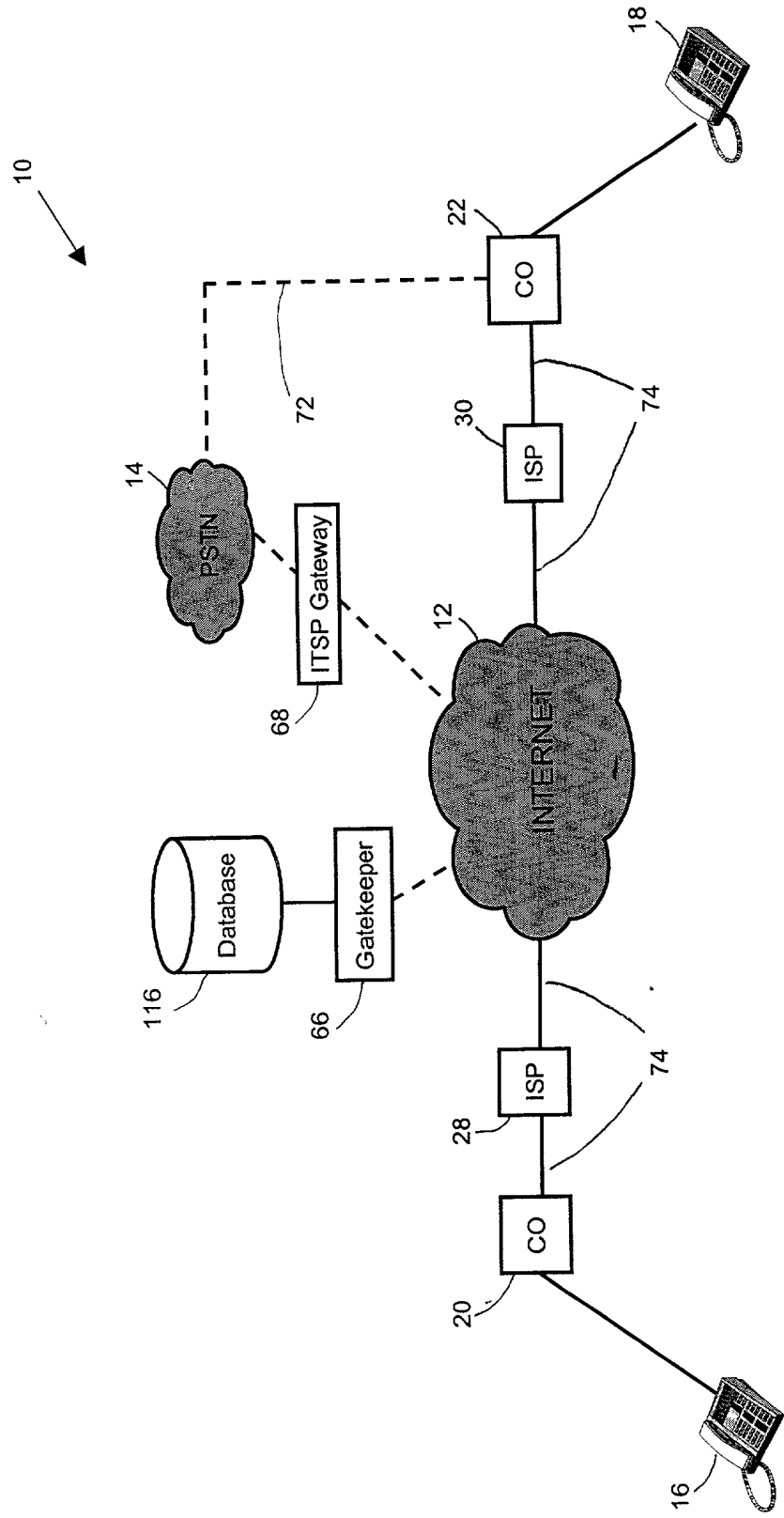


FIG. 3

36
↙

Identification Number	IP Address	Conference Call Feature Available	Caller ID Feature Available	Call Transfer Feature Available
0010887731	193.30.19.0	Yes	Yes	Yes
0024456891	201.19.874.101	Yes	Yes	No
0000384445	198.55.74.0	No	No	No
0025438984	193.30.20.105	Yes	No	Yes
:	:	:	:	:
0049844948	255.255.20.40	Yes	No	No
:	:	:	:	:

FIG. 4

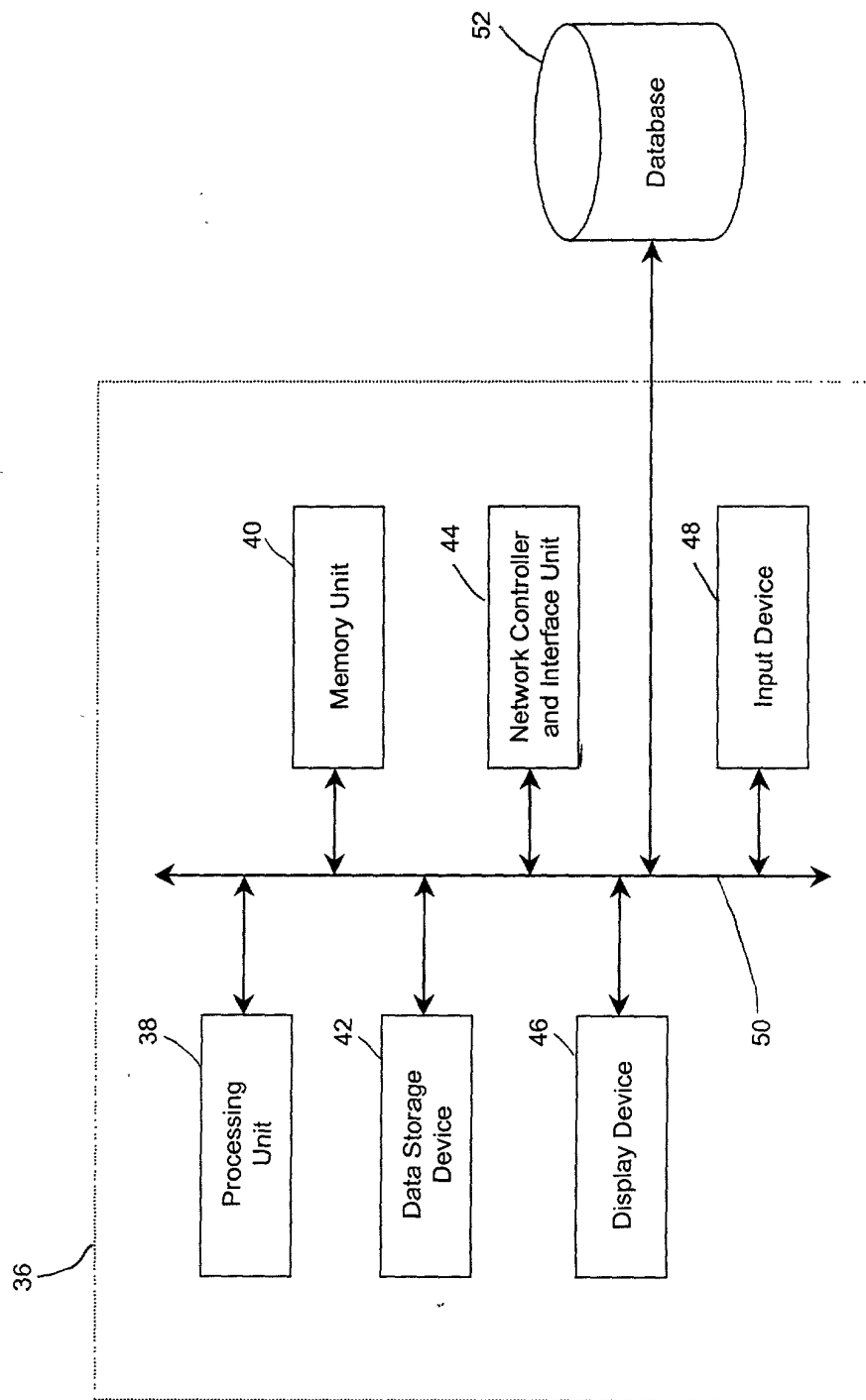


FIG. 5

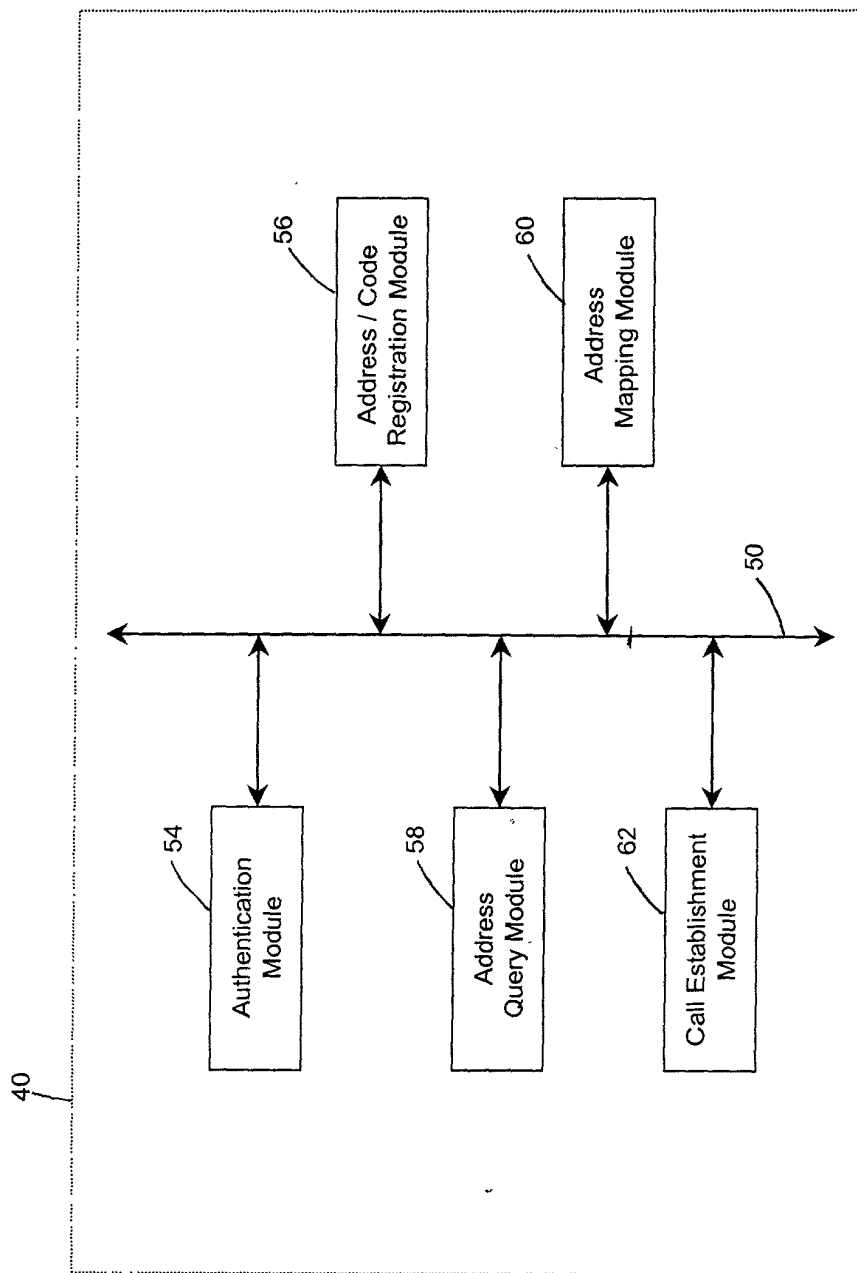


FIG. 6 is a perspective view of a device 16, which may be a handheld device, such as a mobile phone, a PDA, a tablet, or a laptop. The device 16 includes a display 76, a speaker 78, a microphone 80, a camera 82, and a sensor 84. The device 16 is shown in a perspective view, with the display 76 on the front face and the speaker 78, microphone 80, camera 82, and sensor 84 on the side face.

FIG. 6

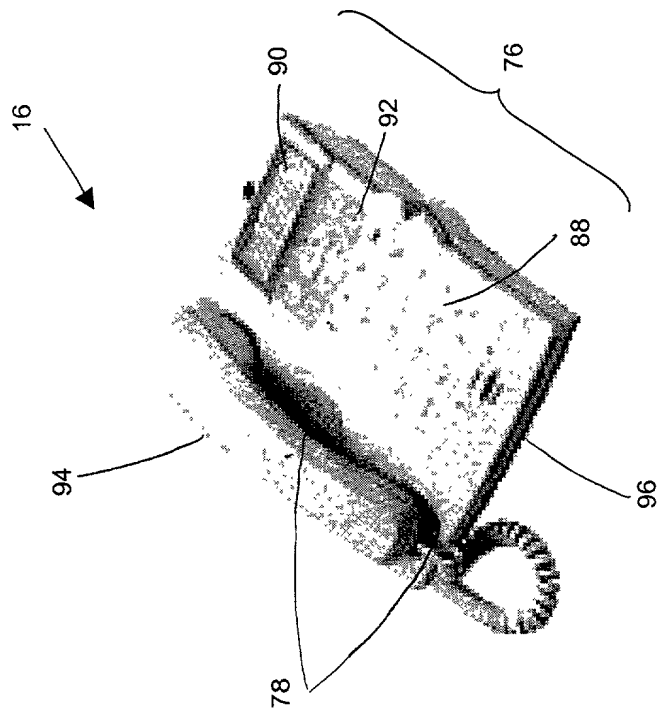


FIG. 9

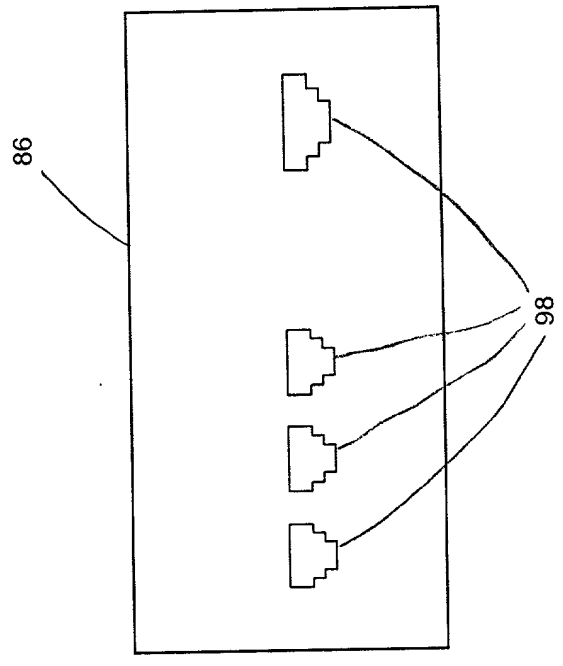


FIG. 7

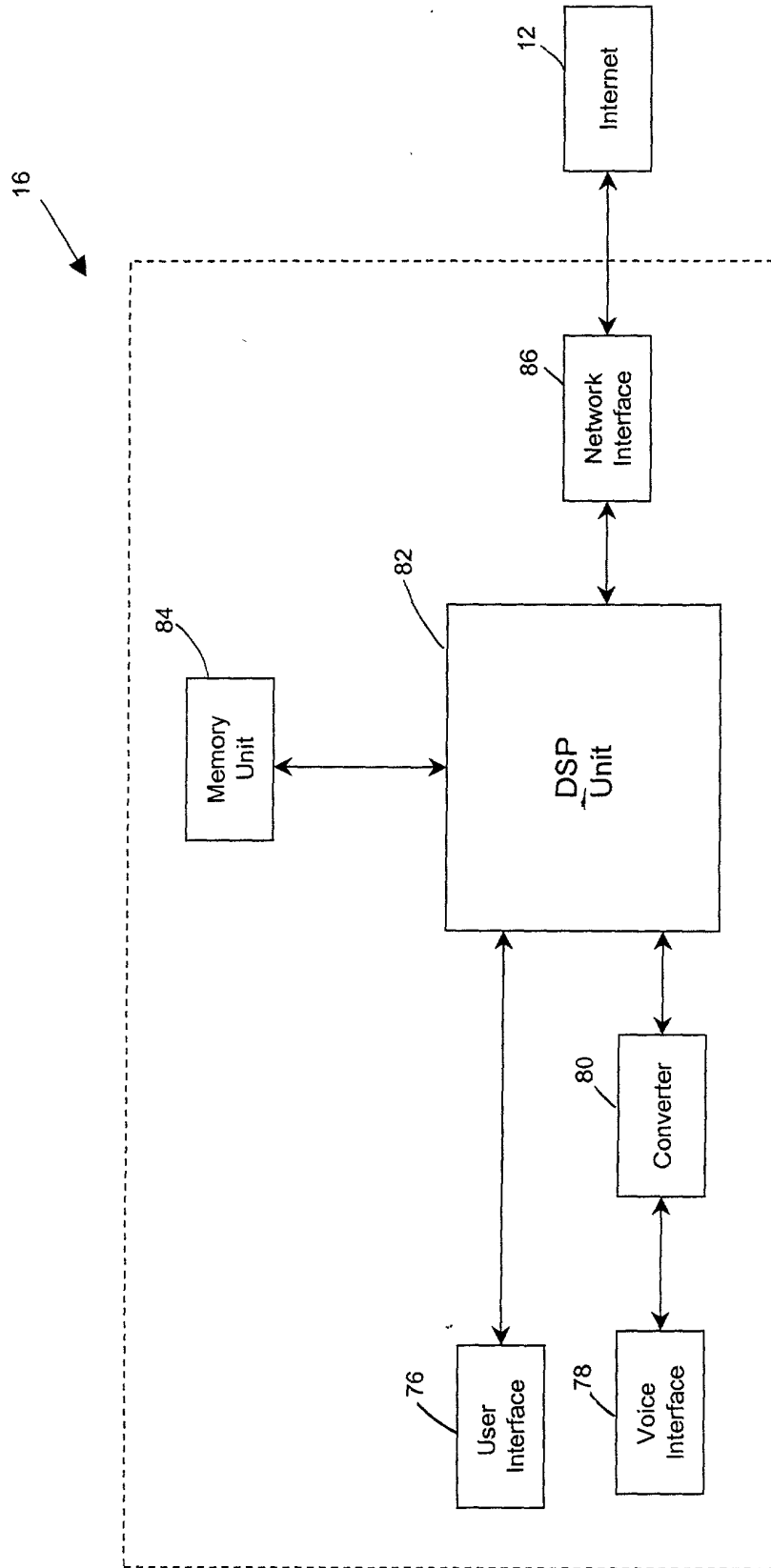
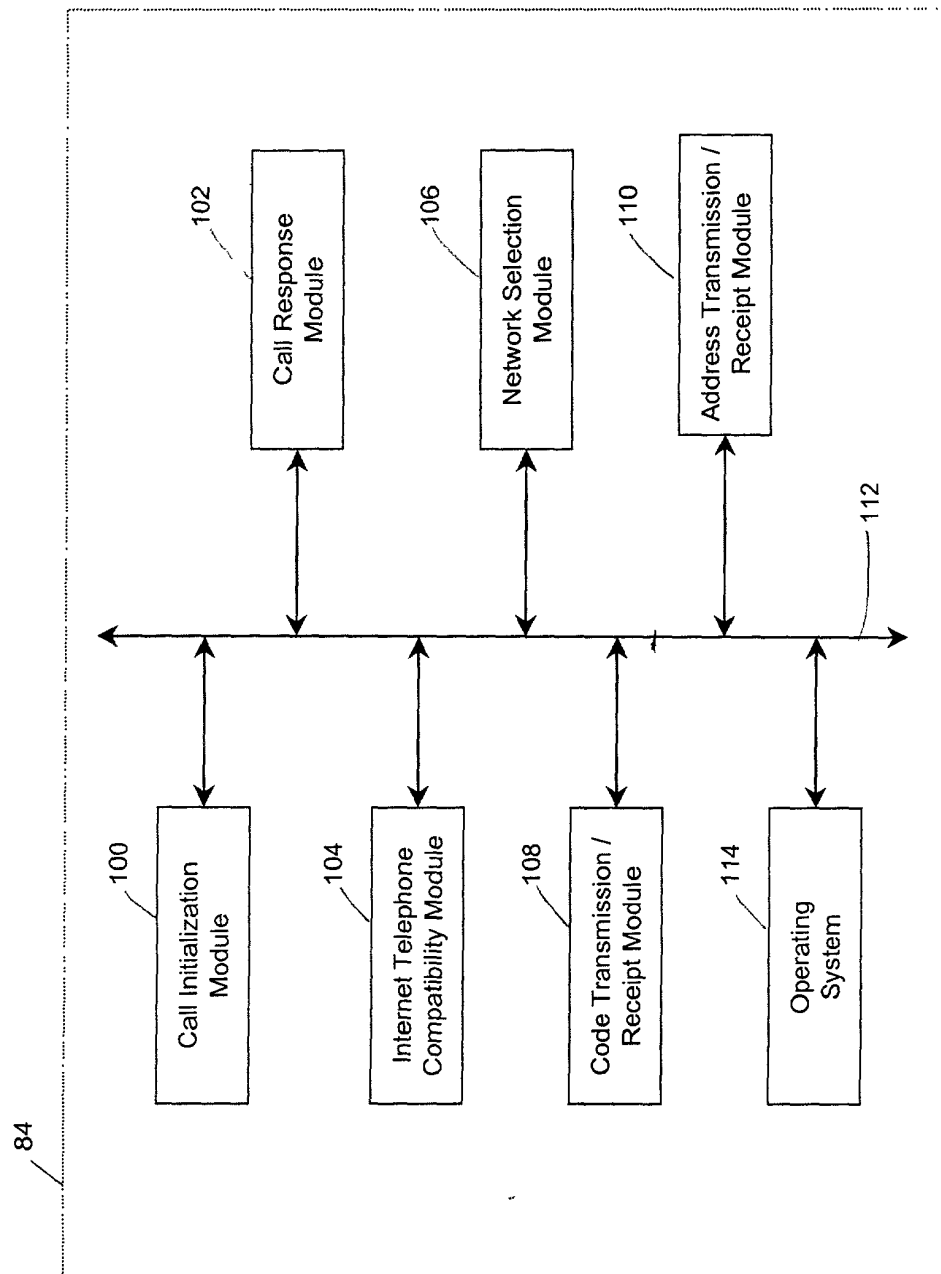


FIG. 8



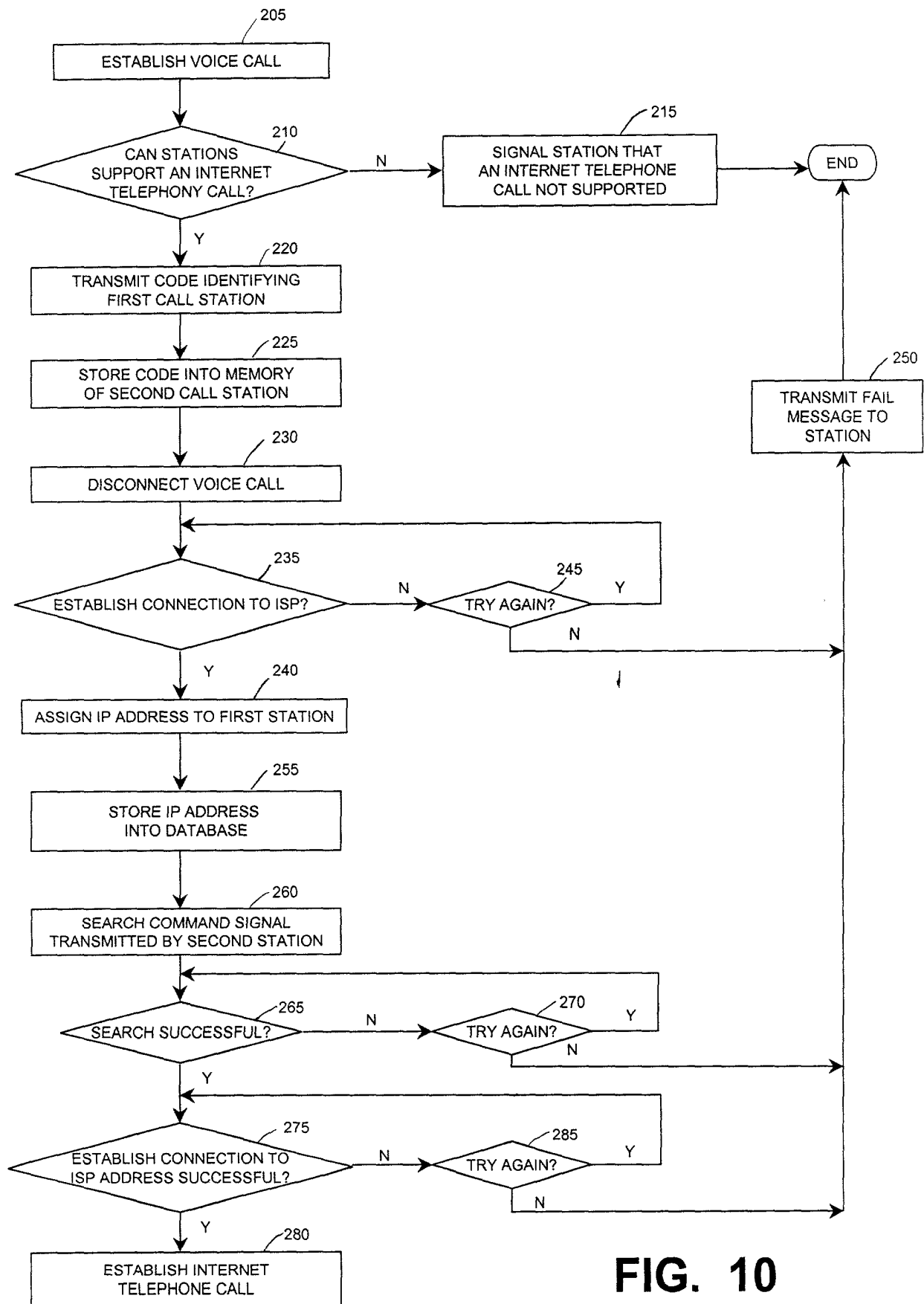


FIG. 10

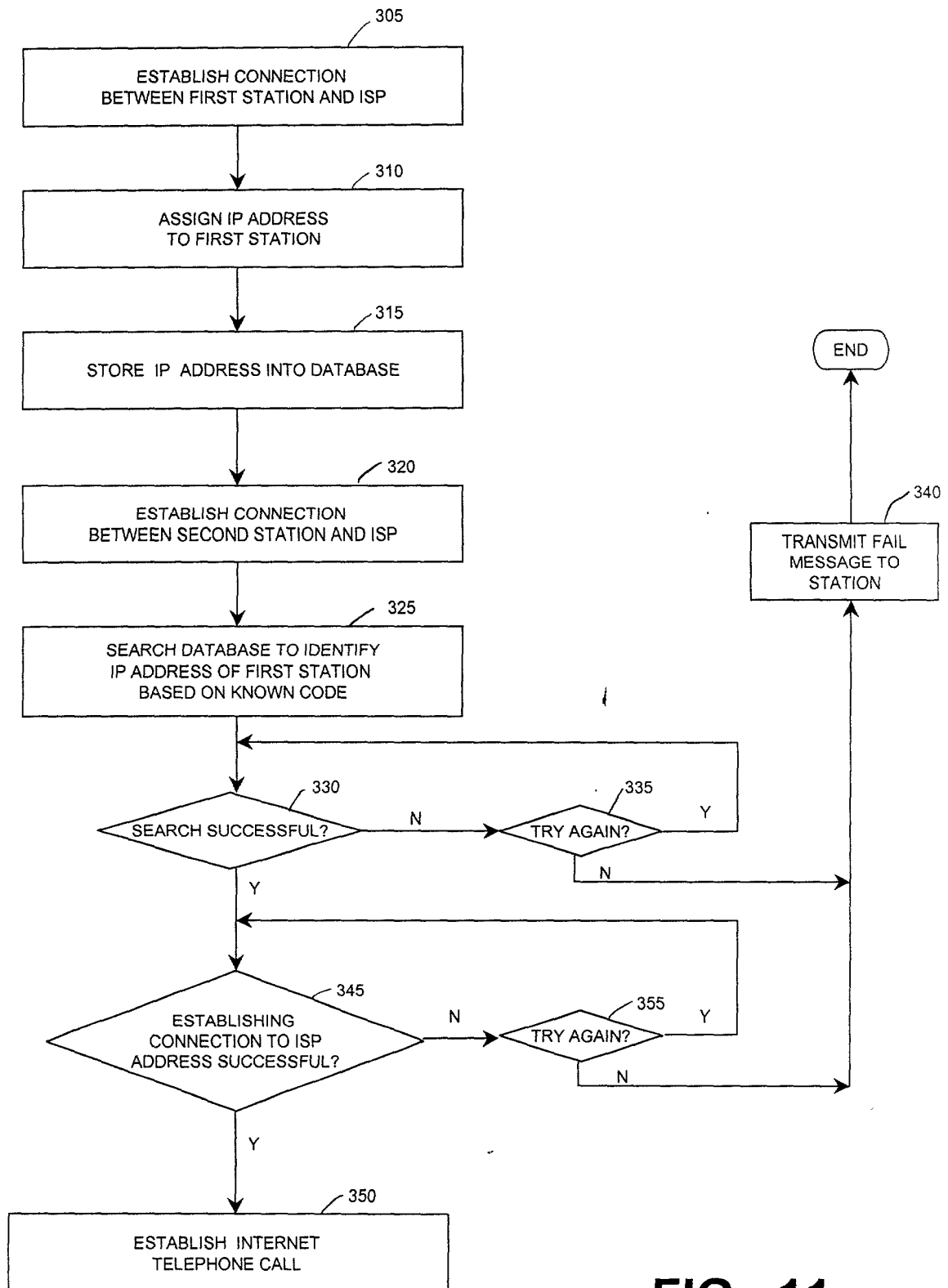


FIG. 11

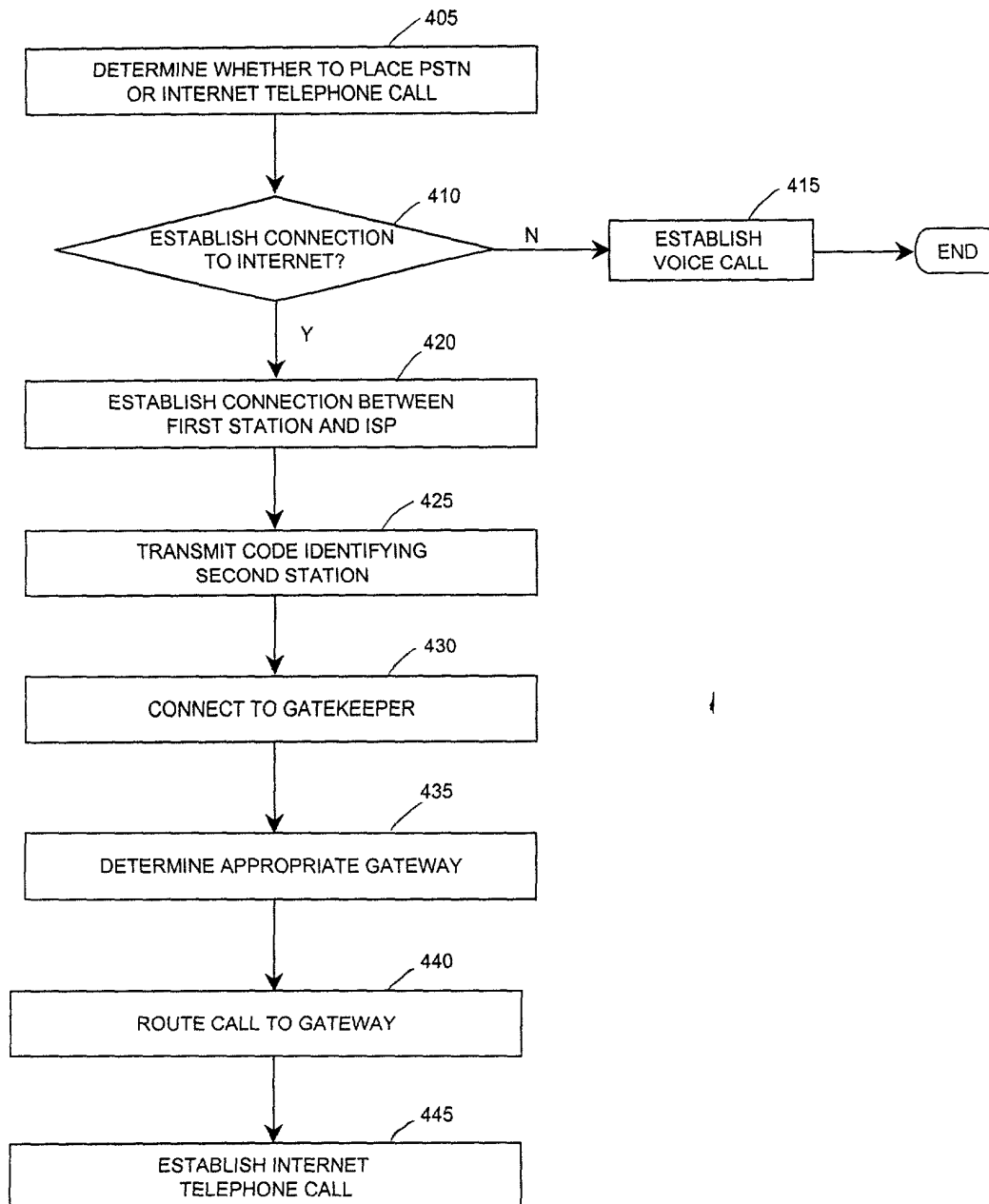


FIG. 12

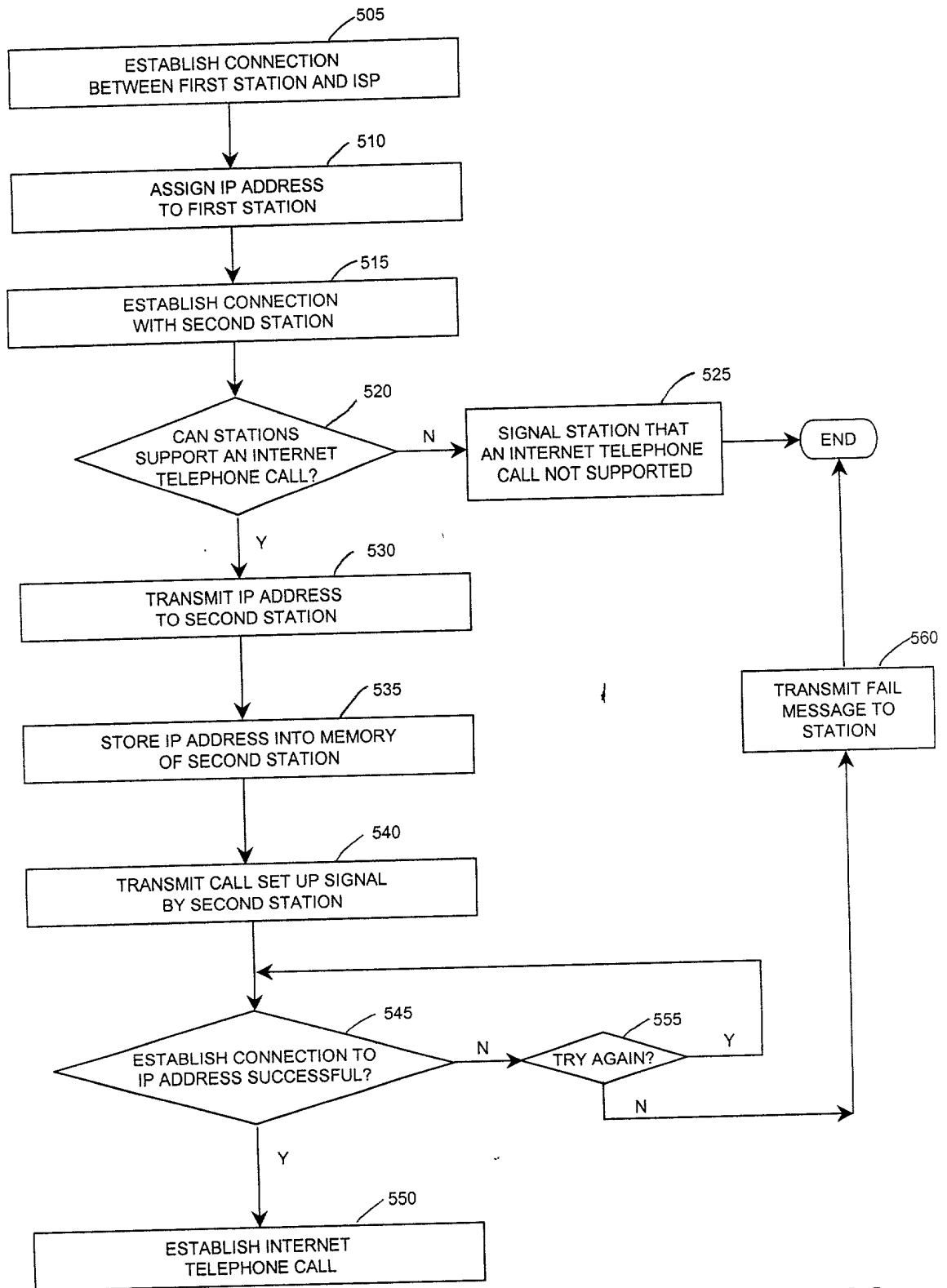


FIG. 13

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to Provisional and PCT International Applications)

As below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name; I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent application is sought on the invention entitled:

"Method and System for Providing Voice Communication Over Data Networks"

the specification of which:

☒ is attached hereto.

☐ was filed as United States Application No. _____ on _____
and was amended on _____ (if applicable).

☐ was filed as PCT International Application No. _____ on _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 (a) – (e) of any foreign applications for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119:			
COUNTRY (IF PCT, INDICATE "PCT")	APPLICATION NUMBER	DATE OF FILING (DAY, MONTH, YEAR)	PRIORITY CLAIMED UNDER 35 U.S.C. § 119
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

60/161,168
Application Number

October 22, 1999
Filing Date

60/166,085
Application Number

November 17, 1999
Filing Date

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to Provisional and PCT International Applications)

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s) or PCT International Application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose to the Office all information known to me to be material to the patentability as defined in Title 37, Code of Federal Regulations § 1.56, which became available to me between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120				
U.S. APPLICATIONS		STATUS (CHECK ONE)		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
PCT APPLICATIONS DESIGNATING THE U.S.				
PCT APPLICATION NO.	PCT FILING DATE	U.S. APPLICATION NUMBERS ASSIGNED		

I hereby appoint the following attorneys and agents to prosecute said application and to transact all business in the U.S. Patent and Trademark Office connected herewith and to file, prosecute, and to transact all business in connection with international applications directed to said invention:

Greg Sueoka

33,800

and: Victoria Mah (44,889)

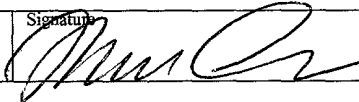

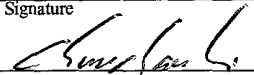
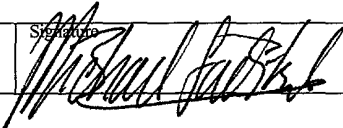
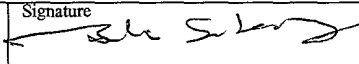

Address all correspondence to:

**Komodo Technology, Inc.
170 Knowles Drive, Suite 2
Los Gatos, California 95032**

Address all telephone calls to: Victoria Mah at (408) 871-3488.

I hereby declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to Provisional and PCT International Applications)

Full Name of Sole or First Inventor	Signature	Date
Michael C. Chen		4/5/00
Residence	Citizenship	
5848 Corumba Court, San Jose, CA 95120	Taiwan	
Post Office Address		
(same as above)		
Full Name of Second Joint Inventor	Signature	Date
Jan Fandrianto		4/5/00
Residence	Citizenship	
511 Santa Rosa Drive, Los Gatos, CA 95032	U.S.	
Post Office Address		
(same as above)		
Full Name of Third Joint Inventor	Signature	Date
Chun-Chau Lin		4/5/00
Residence	Citizenship	
7533 Heatherwood Drive, Cupertino, CA 95014	U.S.	
Post Office Address		
(same as above)		
Full Name of Fourth Joint Inventor	Signature	Date
Michael P. Sadikun		4/5/00
Residence	Citizenship	
271 Auburn Way, #1, San Jose, CA 95129	U.S.	
Post Office Address		
(same as above)		
Full Name of Fifth Joint Inventor	Signature	Date
Budi Sutardja		4/5/2000
Residence	Citizenship	
2010 Nelson Road, Scotts Valley, CA 95066	Indonesia	
Post Office Address		
(same as above)		
Full Name of Sixth Joint Inventor	Signature	Date
Ramah Sutardja		4/5/2000
Residence	Citizenship	
21575 Monrovia Street, Cupertino, CA 95014	U.S.	
Post Office Address		
(same as above)		
Full Name of Seventh Joint Inventor	Signature	Date
Residence	Citizenship	
Post Office Address		
Full Name of Eighth Joint Inventor	Signature	Date
Residence	Citizenship	
Post Office Address		